

BEYOND ENERGY, **CREATE HAPPINESS**

2018 Sustainability Report



About This Report

Purpose of the Report

This report is the eighth Sustainability Report published by Korea Western Power (KOWEPO) Co., Ltd. As a government-owned power company, KOWEPO faithfully fulfills its social responsibilities and publishes the Sustainability Report biennially to share and communicate its activities and achievements with stakeholders.

Preparation of the Report

This report has been prepared in accordance with the Sustainability Reporting Guidelines of the GRI Standard (G4 Comprehensive), the GRI Electric Utility Sector Supplement, UNGC, and UN SDGs.

Reporting Scope and Period

The reporting scope of this report includes the headquarters and four domestic operation sites (Taeon Thermal Power Complex Division, Pyeongtaek Thermal Power Complex Division, Seoincheon Combined Cycle Power Complex Division, and Gunsan Combined Cycle Power Division) and the reporting period covers the year 2016 and 2017. This report includes the performance of the first half of 2018 for some issues and presents the data for three years from 2015 to 2017 to show the trend change of some quantitative performance.

Validation of the Report

This report was prepared by a review of the working-level personnel of KOWEPO and has been verified by THE CSR Co., Ltd. to assure the reliability. THE CSR confirmed that the content of this report conform to the GRI Standard Comprehensive. Please refer to the Appendix for the detailed assurance statement.

Additional Information

This report is published in Korean and English, and available on KOWEPO's website (<https://www.iwest.co.kr>). Please place inquiries to the following contact details if you have any opinion on this report.

Inquiry

Homepage www.iwest.co.kr

TEL +82-41-400-1213

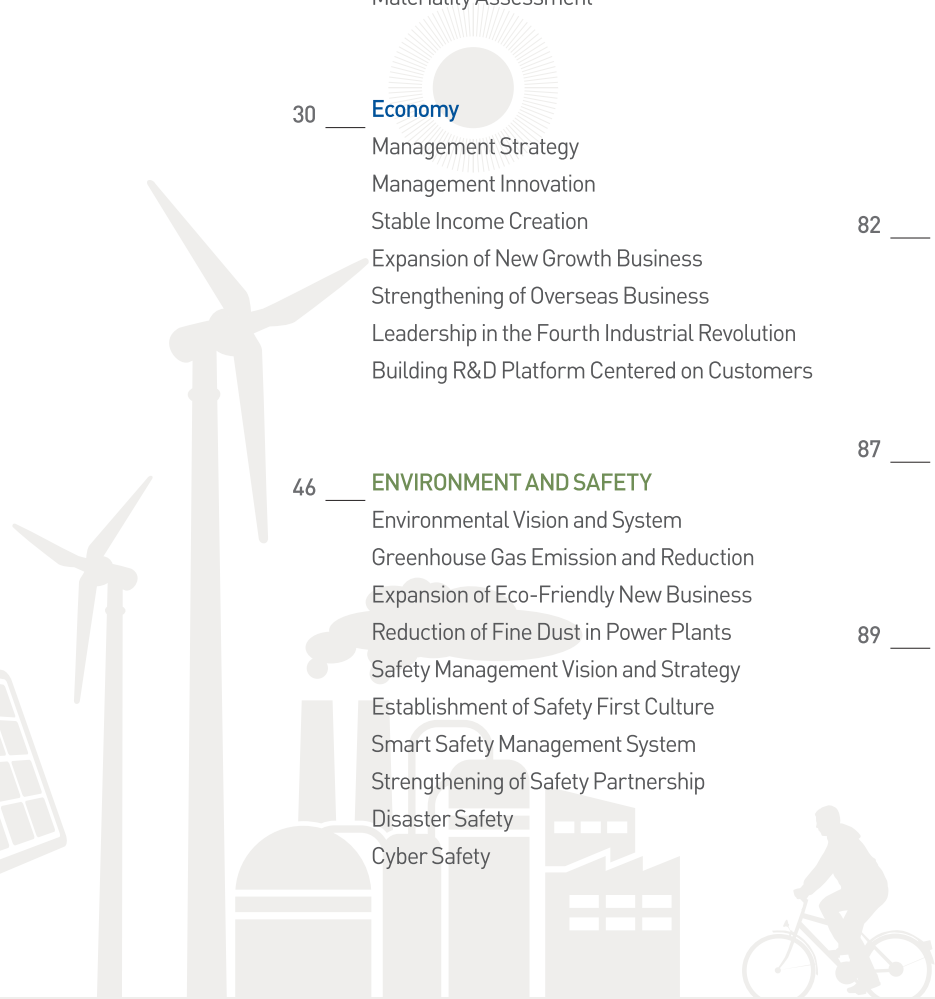
Department in charge Future Response Strategy Office

Email seonbilee@iwest.co.kr



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“We will build the foundation for sustainable growth through fundamental innovation and lead materializing social value to solidify our place as the energy company that creates happiness for the people.”

Dear stakeholders,

I would like to express my gratitude for your interest in and support of KOWEPO.

KOWEPO is a power company established in April 2001 and has been growing into Korea's leading government-owned energy company by continuously innovating internally and openly communicating externally for the past 17 years. We have contributed to the stable national power supply by recently completing the construction of large power plants such as Tae'an Units 9 and 10 and IGCC Power Plant. We are also investing heavily on the expansion of renewable power generation systems such as the development of Lake Iwon floating solar panels and establishment of offshore wind farms. We are also leading the efforts to improve citizens' quality of life through clean energy, such as establishing the foundation to reduce fine dust drastically by introducing a new technology for the first time in Korea to solve the problem that has become a public concern.

KOWEPO is facing a rapid change of business environments such as the limitation of large-capacity thermal power generation due to the shift of energy paradigm, launch of new climate scheme, and proliferation of the Fourth Industrial Revolution. Hence, KOWEPO would like to present the following three promises to our stakeholders to leap forward in sustainable growth based on these changes.

First, KOWEPO will transform itself into a differentiated power company through extensive and fundamental innovations.

We are implementing the WP-MOVE project which is the company-wide innovation project to build the sustainable management base. We intend to secure differentiated competitiveness by implementing 55 innovation programs from the faithful execution of its role as the government-owned power company to the transformation into the future-oriented corporate culture as identified by employees.

Second, KOWEPO will focus on securing growth engines in the future.

As we are facing the limitation of the growth potential of thermal power generation in Korea, KOWEPO has announced 3025 Renewable Energy Roadmap to build the foundation to expand the power generation from renewable energy to 25% by 2030. We are expanding our business centered on the key regional base such as Indonesia to develop high-quality overseas businesses and making full efforts to enter Panama, Kenya and other fast-growing emerging markets. Moreover, we intend to actively pursue new challenges such as the development of high value-added business models in the power generation industry by converging the accumulated power plant operating know-how and new technologies in the Fourth Industrial Revolution.

Third, KOWEPO will become the company that is trusted by and endeared to the public by leading the embodiment of social values.

We will fulfill our social responsibility as a public enterprise by creating good jobs, growing together with business partners, and continuously identifying and carrying out KOWEPO's differentiated business to promote the local economy. Moreover, we will do our best to meet the expectation of our stakeholders by establishing transparent and fair culture.

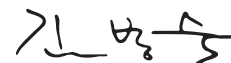
Respected stakeholders,

This eighth Sustainability Report contains KOWEPO's efforts and commitment to keep the above three promises. I look forward to your continued support and encouragement to the endeavor of KOWEPO to fulfill its role as a good neighbor of the community, a strong partner of small and medium enterprises, and the energy company to create the happiness for the people. Thank you.

September 2018

Kim Byung Sook

President & CEO of Korea Western Power Co., Ltd.



Company Profile

KOWEPO operates four power generation complexes in Taeon, Pyeongtaek, Seoincheon, and Gunsan for a total capacity of 11,314 MW or about 10% of total installed capacity in Korea. About 2,350 employees of KOWEPO are responsible for contributing to the national economic development and people's livelihood by providing the stable and economical supply of high-quality electricity. In line with the government's policy to expand renewable energies, KOWEPO plans to expand the portion of renewable energy to 25% of total power generation by 2030. Moreover, KOWEPO is participating in the construction and operation of power plants in Indonesia, Laos, Myanmar, India, and other countries to expand future growth engines and improve our capabilities.

Company Name	Korea Western Power Co., Ltd.
Date of Establishment	April 2, 2001
CEO	Kim Byung Sook
Type of Business	Power generation, power development, and audit
Employees	2,352
Business Domain	Electric power
Address of Headquarters	285, Jungang-ro, Taeon-eup, Taeon-gun, Chungcheongnam-do

Asset (KRW million)

9,628,671



Sales (KRW million)

4,222,449



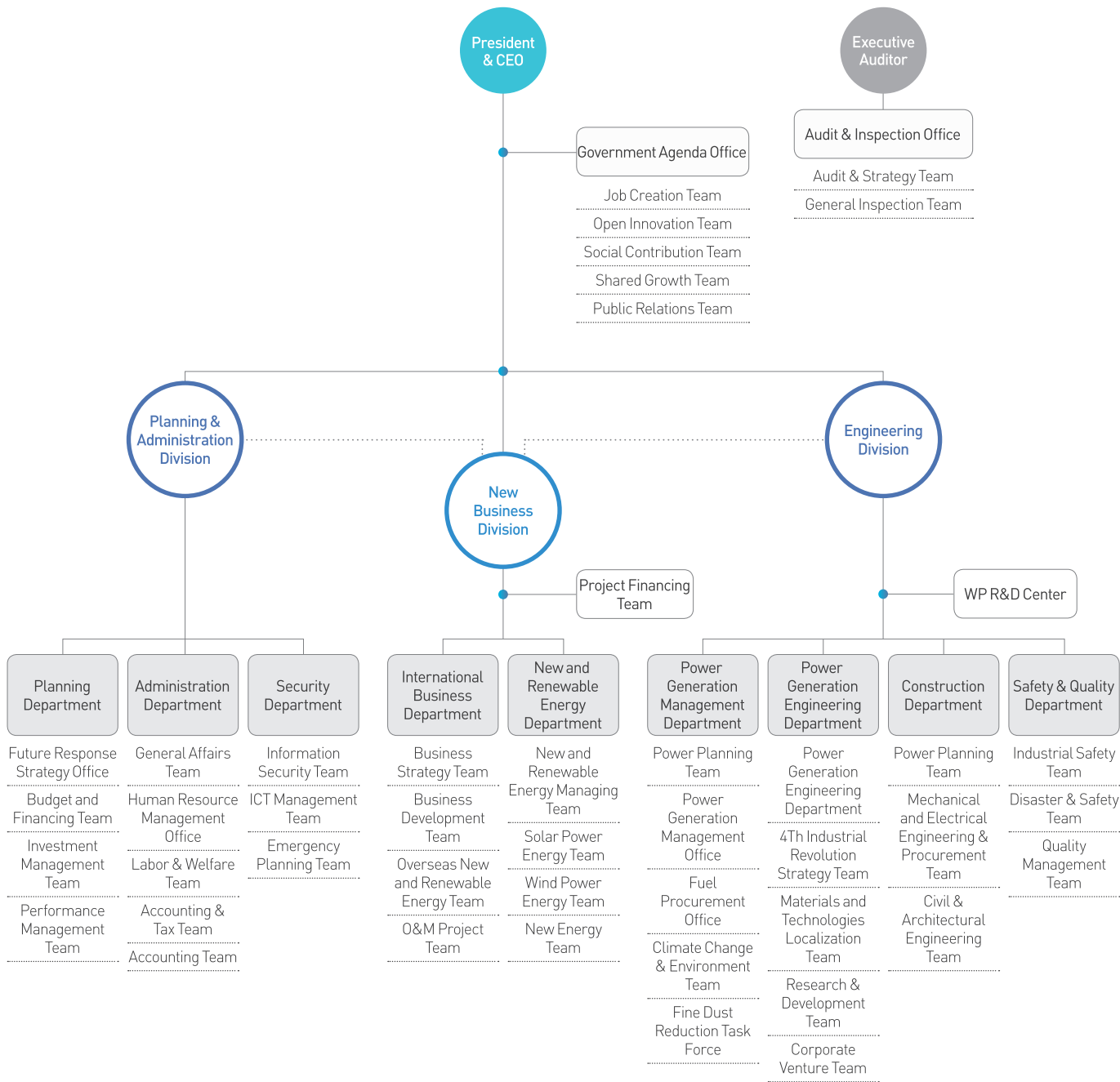
Debts (KRW million)

5,746,278



Organization Chart
Headquarters

As of August 2018



Power Plants

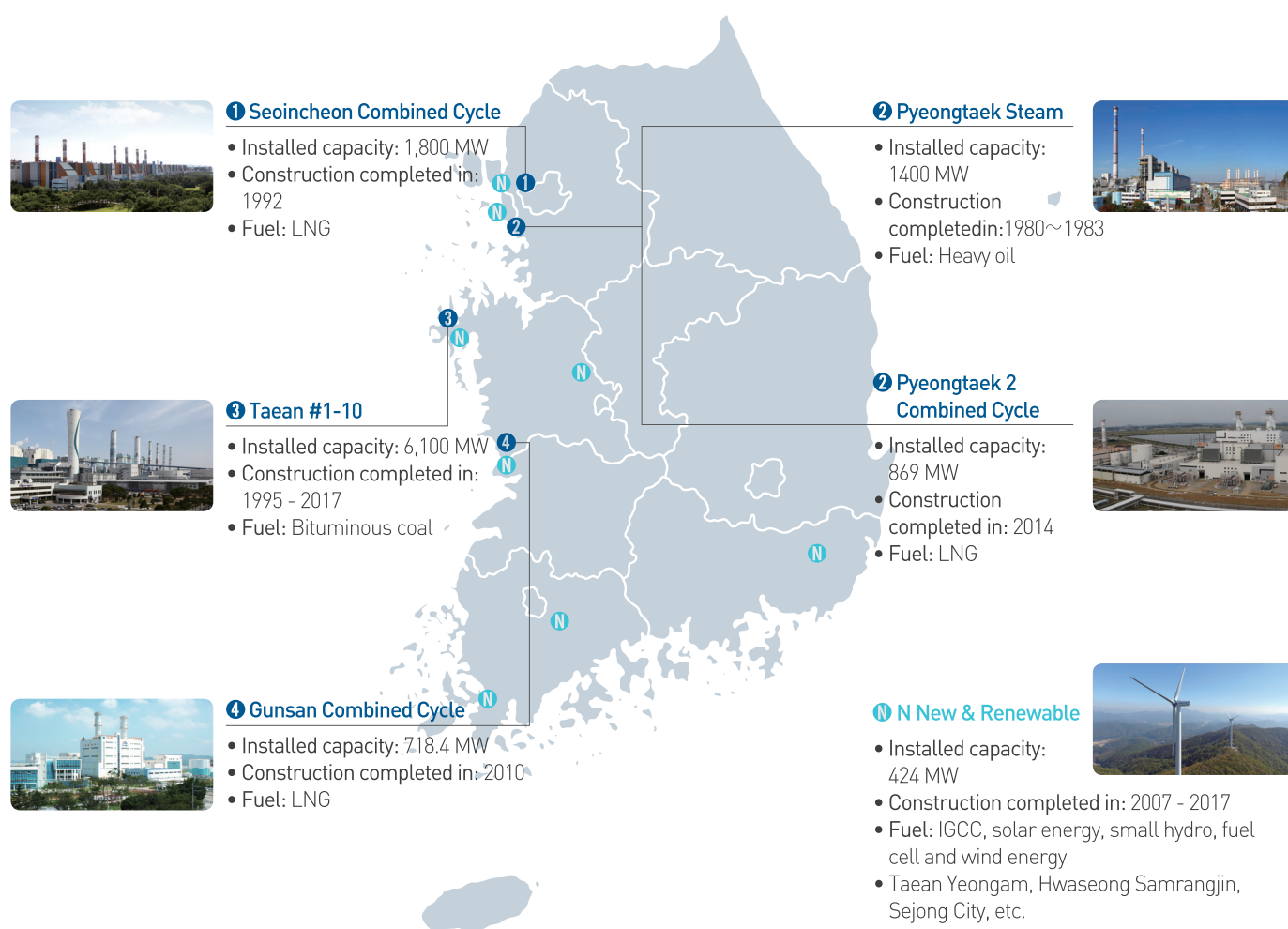


Current Status of Business

Domestic Business

Power Plant Operation

KOWEPO operates four power generation complexes (Taeon Thermal Power Complex Division, Pyeongtaek Thermal Power Complex Division, Seoincheon Combined Cycle Power Complex Division, and Gunsan Combined Cycle Power Division) in Korea for a total power generation capacity of 11,314 MW (as of June 30, 2018) which accounts for 9.7% of total domestic installed capacity. In order to provide a stable electric power supply, which is the primary purpose of the power generating business, KOWEPO carries out the expansion of domestic facility capacities, replacement of obsolete equipment in a timely manner, and quality assurance at the construction stage.





Taeon Thermal Power Complex Division

The Taeon Thermal Power Complex Division is the core power generation complex of KOWEPO. It operates thermal power plants that take approximately 45% of the company's generation facility capacity and is equipped with cutting-edge automatic control facilities. It strives to build eco-friendly power plants by equipping them with the latest flue gas desulfurization facilities, continuous coal handling machines to prevent coal dust, and wastewater treatment facilities for all generators. The division is the model of the Korean standard thermal power plant and produces the clean and high-quality electricity as the energy leader for the Era of West Coast.



Pyeongtaek Thermal Power Complex Division

The Pyeongtaek Thermal Power Complex Division operates the steam power plants that use natural gas and heavy oil and the combined cycle power plants that use only the natural gas. It is transforming itself into eco-friendly power plants with the world's top class technology in operation and the environmental system and has completed construction of the new combined cycle power plant using natural gas to fulfill its role as the largest hub power plant in the capital region. With the motto of "Love for Humankind, Love for Nature, and Love for Culture," it is creating warmhearted neighborhoods and happy energy by contributing the development of local community through the increase of income and welfare of residents and enhancement of educating environment in the local communities.



Seoincheon Combined Cycle Power Complex Division

The Seoincheon Combined Cycle Power Complex Division is an eco-friendly power plant which uses the natural gas of clean fuel, generating almost no air pollution. The division has an excellent load follow capacity that can respond flexibly to power demand and contributes to the stable operation of the power system due to the quick start-stop function of gas turbines.



Gunsan Combined Cycle Power Division

The Gunsan Combined Cycle Power Division is an eco-friendly power plant that uses LNG for fuel. Although it was built in a densely populated area within a city, it is considered as the role model for urban power plants through the thorough environmental management and the use of clean fuel to solve the environmental problem. In particular, it has the highest generating efficiency domestically by applying the latest G-class gas turbine for the first time in Korea. It supplies the stable power the Saemangeum region, which is becoming the economic hub in northeast Asia, based on the cutting-edge power generation system and is contributing to the economic growth of Jeollabukdo region.

New Construction



Shinpyeongtaek Combined Cycle

KOWEPO is constructing the power generation facility with 942.9 MW capacity using natural gas as fuel inside the Pyeongtaek power plant to secure the highest competitiveness through the direct supply of fuel and the increased synergy through sharing the facilities of Pyeongtaek No. 2 Combined Cycle Power Plant. Its construction began in January 2017 and will be completed in November 2019.



Taeon No. 2 Small Hydro

Taeon No. 2 Small Hydro Plant will generate power using the pressure head of the cooling water drainage from the integrated gasification combined cycle (IGCC) of Taeon Units 9 and 10 and have the installed capacity of 5 MW. Its construction began in December 2016 and will be completed in March 2020.



Jangheung Wind Power

KOWEPO is constructing a wind farm with the capacity of 16 MW in the Jangheung region to expand the portion of new and renewable energy. Its construction began in June 2018 and will be completed in May 2019.

Overseas Business

KOWEPO is diversifying the profit-generating structure by building business structures for the overseas plant O&M (operating and maintenance) and the CM (construction management) service using internal construction personnel. In particular, KOWEPO is carrying out the overseas business centered on coal and gas power generation that the analysis of global energy consumption trends shows patterns of the steady increase of consumption; hydraulic power generation that is expected to bring stable profits; and O&M projects that can realize maximum profits with minimum investment based on the company’s core capabilities. KOWEPO plans to carry the overseas projects forward by laying the profit foundation and enhancing the efficiency of promoting projects using the core capabilities.

Operation (7 Cases)

as of December 2017



● Saudi Arabia Rabigh Heavy-oil O&M	1,204 MW
● Australia Moolaben Coal Mine	-
● Indonesia Sumsel 5 O&M	300MW
● Indonesia Floating Coal Terminal	8.0 million ton/year
● Bayan Resources Tbk	8.0 million ton/year
● Panama Colon CCPP Commissioning	380 MW
● India Maharashtra Gas Combined Cycle	388 MW

In Progress (3 Cases)

as of December 2017



● Laos Xe-Namnoy Hydro	410 MW
● Australia Bylong Mine	5.0 million ton/year
● Australia Bannerton Solar	110 MW

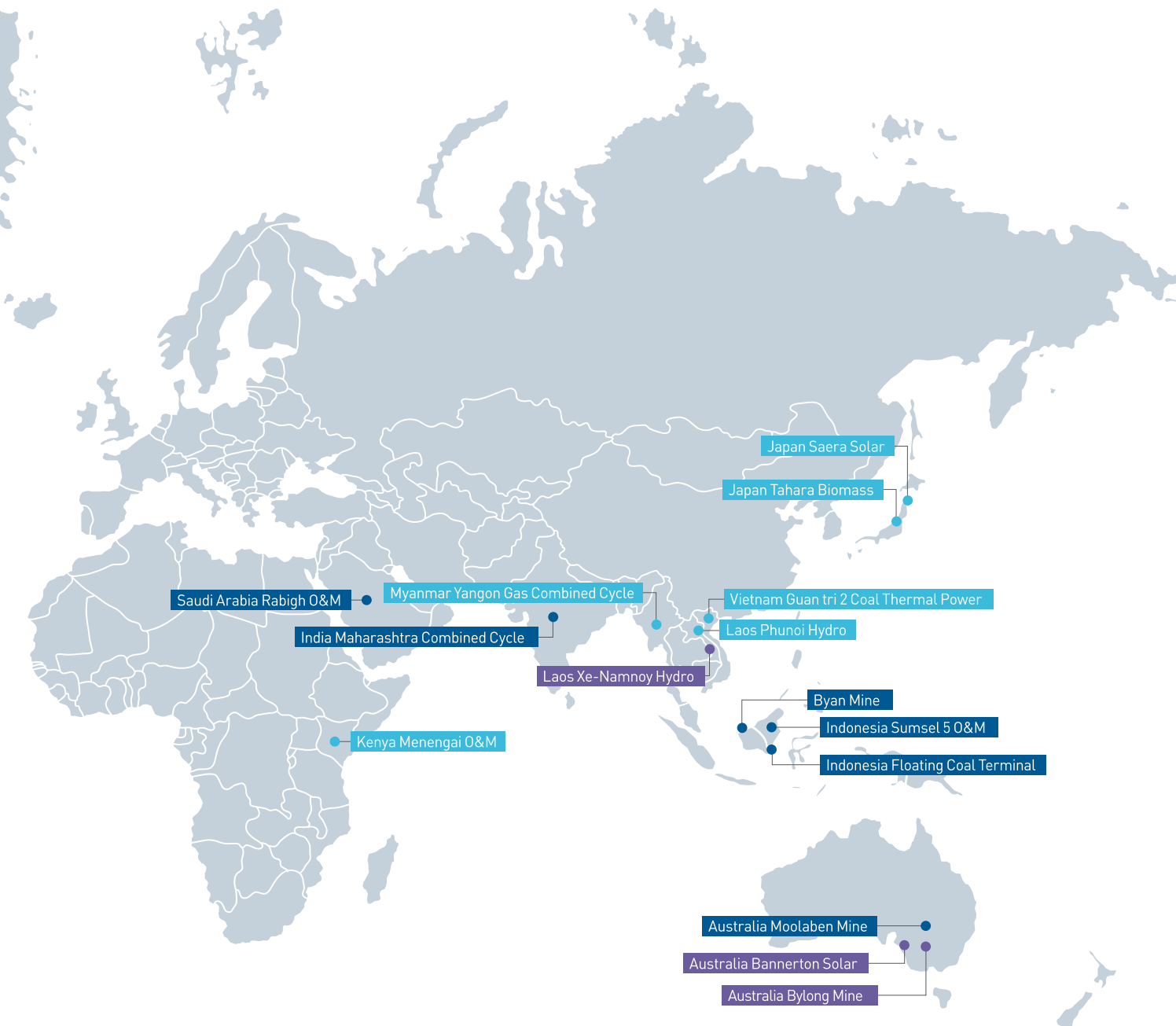
In Development (6 Cases)

as of December 2017



● Myanmar Yangon Gas Combined Cycle	500 MW
● Vietnam Guan tri 2 Coal Thermal Power	1200 MW
● Laos Phunoi Hydro	728 MW
● Japan Tahara Biomass	50 MW
● Japan Saera Solar	55 MW
● Kenya Menengai Geothermal Power Plant O&M	35 MW





WP HISTORY

2001-2018

2001

- 04 Separation from KEPCO
Establishment of Korea Western Power Co., Ltd
- 09 Declaration of Corporate Philosophy and CI



Corporate Philosophy and CI

2007

- 08 Completion of Taejeon Thermal Power Plant No 7 and No.8
- 09 Declaration of Vision 2020
- 11 Won the Prime Minister Prize at the Korea Safety Awards
- 12 Achieved the Highest Sixth Stage of the Government Innovation



Declaration of Vision 2020

2006

- 02 Won the Grand Prize at Transparent Management
- 06 Joined the UN Global Compact
Won the beautiful companion prize of the Prime Minister
- 09 Acquired A1 Credit Rating from Moody's
- 12 Won the large & small business cooperation prize at the Prime Minister



Won the beautiful companion prize of the Prime Minister

2008

- 01 Won the Grand Prize at the Korea Innovation Management Awards
- 05 Built Mid-to Long-Term HR Cultivation Models Won the Grand Prize at Social Contribution
- 09 Acquired A Credit Rating from S&P
Certified as an excellent human resource
- 11 Signed the agreement for the construction of hydro power plant 390 MW in Laos



Won the Grand Prize at the Korea Innovation Management Awards

2009

- 03 Won an O&M business contract of Saudi Arabia's Rabigh Heavy-oil Thermal Power Plant
- 07 Hold a donation event for rare disease
- 10 MOU for the Electricity Safety



MOU for the Electricity Safety

2002

- 09 Completion of Taean Thermal Power Plant Units 5 and 6
- 10 Declaration of Ethics Management
- 12 Received ISO 9001 Certification for all operation sites
Acquired OHSAS18001
Successfully issued \$150 million Eurobond (1st)



ISO 9001 Certification for all operation sites

2003

- 06 Won the Grand Prize for Environmental Management Award
- 08 Introduced 6 Sigma management innovation technique
- 11 Groundbreaking of Taean Thermal Power Plant Units 7 and 8
Won the Presidential Prize at National Quality Awards



Introduced 6 Sigma management innovation technique

2005

- 04 Establishment of a corporate anthem "KOWEPO Anthem"
- 07 Establishment of Cheongna Energy Co., Ltd.
- 10 Won the Grand Prize at Management Innovation Best Practice Awards
- 12 Won the Grand Prize at Korea Quality Awards



Establishment of a corporate anthem "KOWEPO Anthem"

2004

- 08 Foundation of the volunteer group
- 10 Won Grand Prize at GWP Korea
- 11 Proclamation of Safety Management Charter
- 12 Company-wide application of the Six Sigma Management Innovation Method



Won the Grand Prize at Safety Management

2010

- 09 Completion ceremony of Gunsan combined cycle power plant
- 10 Won the Grand Prize at Korea Ethics Management Awards
- 12 Achieved the first P grade of PSM (Process Safety Management) among power corporations
Won the Best Company at the Plant Industry-University Collaboration



Completion ceremony of Gunsan combined cycle power plant

2011

- 01 Designated as a market-type public enterprise
- 03 Sponsorship for the "Seed Bank Account"
- 04 Ceremony for WP-TOPS win-win growth
Starting ceremony for university students volunteer group
- 11 Groundbreaking for Taeon IGCC



Starting ceremony for university students volunteer group

2017

- 02 Began power generation of Taeon Unit 10
- 05 Received the Energy Environmental Technology Grand Award
- 06 Received Korea Innovation Grand Award
- 07 Completed construction of Seoincheon Solar
- 09 Declared WP STAR-10 for essential safety guidelines
- 11 Received Presidential Award for Organization in Shared Growth
Received Presidential Prize in Active Administration Contest
- 12 Completed construction of Taeon Units 9 & 10



Construction completion ceremony of Taeon Units 9 & 10

2016

- 05 Completed construction of Taeon Floating Solar Generator
- 06 Received 2016 Korea Innovation Grand Award
- 10 Received Project Management Grand Award
- 11 Received 10 Mechanical Technology Award of the Year
Received Global Standard Safety Management Award
- 12 Received Idea Management Grand Award



Completed construction of Taeon Floating Solar Generator

2018

- 03 Achieved the highest rating for three consecutive years in shared growth performance evaluation of public institutions
- 04 Signed the Agreement for Joint Development of Solar Power Generation in Agricultural and Fishery Villages
- 05 Received 2018 Grand Award in Employment Friendly Section for National Industrial Award
Received 2018 Korea Innovation Grand Award in Management Innovation
Received 2018 Deputy Prime Minister's Prize for National Sustainability Grand Award
Selected as 2018 Korea's Top 100 Companies for Employment
- 07 Achieved the highest rating in 2018 Safety Korea Training for Disaster Management



Signed the Agreement for Joint Development of Win-Win Solar Power Generation in Agricultural and Fishery Villages

2012

- 01 Signed SS-SHA ceremony of Maharashtra power generation
- 04 Leading event for the spread of mutual growth culture
- 10 Signed MOU for promoting the second project of "Happy City Solar Power Generation"
- 11 Groundbreaking Tae'an Units 9 & 10
Won a Prize in the Public Corporation Category at Sustainable Management Awards



Signed SS-SHA ceremony of Maharashtra power generation project

2013

- 02 Signed a contract to purchase power from Xenamnoy Hydro Power in Laos
- 08 Constructed Safety Experience Centers in All Operation Sites
- 10 Won the First Prize in the Public Company Category at the 1st "The Most Loved Companies Award"
- 12 Signed contract for Sumsel 5-O&M in Indonesia



Signed a contract to purchase power from Xenamnoy Hydro Power in Laos

2015

- 04 Pre-Commissioning of Tae'an Thermal Power Plant Unit 9
- 08 Relocation of KOWEPO Headquarters to Tae'an-gun
- 09 Won the 1st in the Sustainability Index
- 10 Established the Safety Management Master Plan
- 11 Won the Presidential and Minister Prizes at the Korea Safety Awards
- 12 Won the Presidential Prize for the Contribution to Job Creation



Relocation of KOWEPO Headquarters to Tae'an-gun

2014

- 11 Completion of the 2nd Pyeongtaek Combined Plant
Completion of Fuel Cell Plant in Seoincheon
Declaration of Vision 2025
Tae'an & Western Power Signed the MOU for Industry Innovation 3.0
- 12 The first Grand Prize Winner at Korea Great Work Place among Public Companies
Achieved 1st Place in the Shared Growth Assessment for Public Institutions for two consecutive years
Achieved the P grade of PSM twice in a row among power corporations
Won the Grand Prize at the Korea IDEA Management Awards

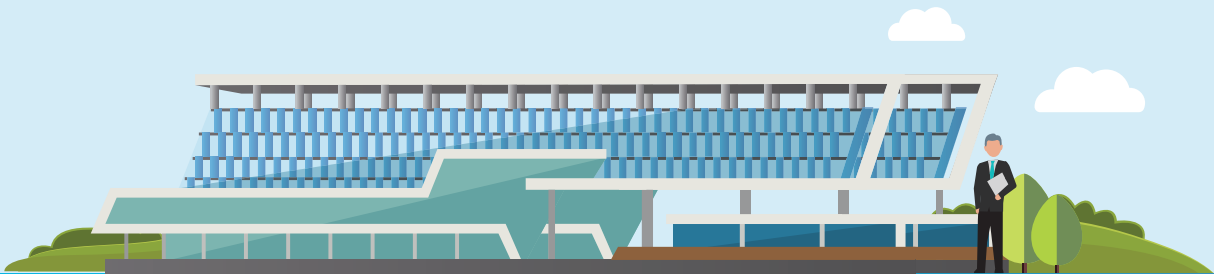


Declaration of Vision 2025

BEYOND ENERGY, CREATE HAPPINESS

Value Chain of KOWEPO

The KOWEPO's value chain activities are to create values suitable for completing KOWEPO's vision, "Beyond Energy, Create Happiness." To that end, KOWEPO shares values created through the establishment of the optimal operating system with society by placing values in the entire supply chain from the necessary resource development to electric supply to distribution in terms of sustainable management.



INPUT

As of the end of 2017

① Strategic Planning

KOWEPO plans the development of the electric power source in accordance with the national power supply plan.



Installed Capacity

11,791 MW



Raw Material Purchase

KRW **2,731** billion



Investment in R&D

KRW **15.4** billion



Investment in Training

KRW **5.8** billion



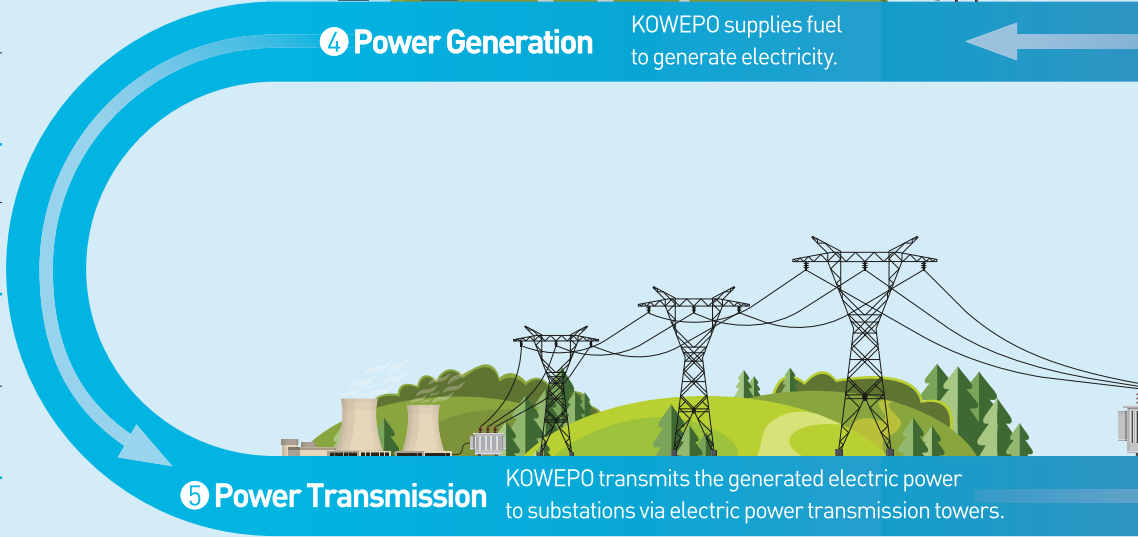
No. of Employees Engaged in Social Contribution

7,515



④ Power Generation

KOWEPO supplies fuel to generate electricity.



⑤ Power Transmission

KOWEPO transmits the generated electric power to substations via electric power transmission towers.

KOWEPO monitors what resources (input) are employed and utilized and what values (output) they create socially and environmentally from the perspective of the sustainable value chain.

2 Power Plant Construction

KOWEPO constructs power plants after conducting the environmental impact assessments and public hearings.

3 Resource Development

KOWEPO purchases and transports fuel for the power generation.

6 Power Distribution

KOWEPO distributes the electric power to customers.



Volume of Power Transaction

44,098 GWh



Market Share

8.7 %



Implementation Rate of Core Technologies

67.8 %



No. of Industrial Property Right Possession

279 cases



Hours of Participation of Employees in Social Contribution

35,727 hours

As of the end of 2017

OUTPUT

Operation of the BOD

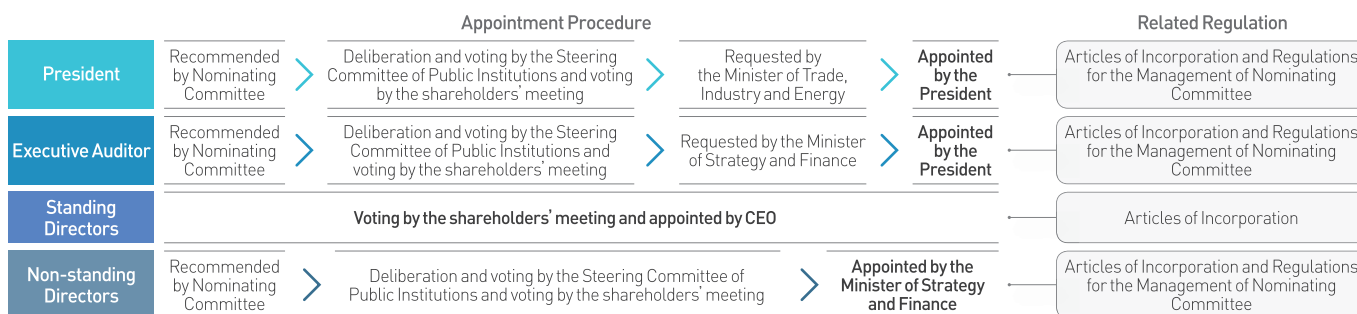
Composition

KOWEPO's board of directors (BOD) is the supreme decision-making body that deliberates and decides on important matters related to company management such as the strategies and policies, supervises management issues, and provides management support. The board of directors is composed of four standing directors and five non-standing directors. The Chairman of BOD is selected from non-standing directors to enhance the transparency of the BOD. The non-standing directors are appointed in consideration of diversity and expertise of the BOD, and at least one member of the non-standing directors is female.

Type	Position	Name	Gender	Professional Background
Standing Directors	President	Kim Byung Sook	Mal	Former) CEO of Uleung Enerpia Former) Head of New Growth Engine Division
	Executive Auditor	Park Dae-seong	Mal	Former) Director of Policy Support, Korea Labor Force Development Institute for the Aged Former) Adjunct Professor, Dept. of Public Administration and Policy, Kookmin University
	Head of Planning & Administration Division	Song Jae-seop	Mal	Former) Head of New Business Division, KOWEPO Former) Head of Management Planning Team, KOWEPO
	Head of Engineering Division	Kim Gyeong-jae	Mal	Former) Head of Taeon Thermal Power Complex Division, KOWEPO Former) Head of Pyeongtaek Thermal Power Complex Division, KOWEPO
Non-standing Directors	Non-standing Directors (Chairman of the Board)	Ju Yong-shik	Mal	Former) Chairman of CICA Former) General Director of International Economic Affairs Bureau, Ministry of Strategy and Finance
	Non-standing Directors	Kim Jeong-suk	Femal	Current) Chairperson of Cheongyang Community Social Welfare Consultative Association Former) Member of Chungcheongnamdo Provincial Assembly
	Non-standing Directors	Ahn Byeong-cheol	Mal	Former) Aide to Health and Welfare Committee of the National Assembly Former) Director of Public Sector Business, Daewoo Information System
	Non-standing Directors	Park Yeong-jong	Mal	Current) Vice Chairman of KPO Former) Director of Daedeok Post Office
	Non-standing Directors	Yun Sang-yong	Mal	Current) Head of Engineering Department, Korea Electric Association Former) Head of Chungbuk Regional Division, KEPCO

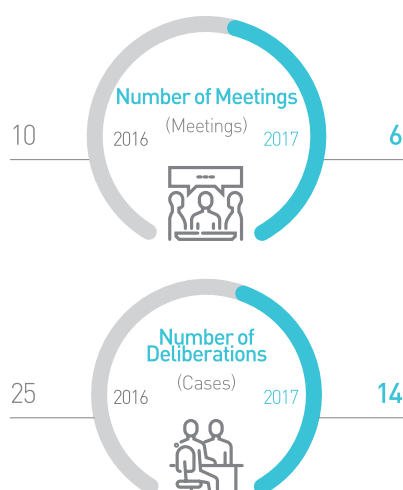
Appointment Procedure

The members of KOWEPO's BOD are appointed according to the procedure specified in the Act on the Establishment and Operation of Public Institutions and the "Regulations for the Management of Nominating Committee." The CEO is recommended by the Minister of Trade, Industry and Energy and appointed by the President after going through the decision-making processes of the Steering Committee of Public Institutions and the shareholders' meeting based on recommendations by the Nominating Committee. The term is three years. The Executive Auditor is recommended by the Minister of Strategy and Finance and appointed by the President after going through the decision-making processes of the Steering Committee of Public Institutions and the shareholders' meeting based on recommendations by the Nominating Committee. The term is two years. The CEO appoints other standing directors through the decision-making process of the meetings of shareholders. The term is two years. Non-standing directors are appointed the Minister of Strategy and Finance after the voting process of the Nominating Committee, the Steering Committee of Public Institutions, and the general shareholders' meeting. The term is two years.



* KOWEPO checks whether the non-standing directors are subject to disqualification under the provisions of commercial law and whether they have a special relationship with KOWEPO. The non-standing directors constitute a majority of the board of directors to ensure independence.

Operation Status of Audit Committee



Evaluation and Compensation of the BOD (1,000 KRW)

Type	Income Type	2015	2016	2017	Increase Rate (3 Years)
President & CEO	Earned Income	127,196	132,067	131,267	2%
	Bonus	57,432	91,005	58,347	-
Average of All Employees	Earned Income	79,794	81,055	81,822	1%
	Bonus	4,802	9,797	9,678	-

* Earned income: Basic pay, fixed allowance, performance compensation, wage-based benefits, and other bonuses

* Bonus: The payment rate is based on the government's evaluation of management performance.

Committees under BOD

The Committees under KOWEPO's BOD make decisions through the reviews and deliberations on the main issues of the agenda to be introduced to the BOD meetings in advance.

Committee Name	Role	Member	Meetings	
			2016	2017
Strategic Management Expert Committee	<ul style="list-style-type: none"> - Review of internal implementation plan and performance to carry out national projects - Preliminary review of agenda items regarding management goals, strategies, or innovation - Preliminary review of issues delegated by the BOD 	3	3	3
Financial Management Expert Committee	<ul style="list-style-type: none"> - Preliminary review of budget, funds, mid- and long-term financial management plans, and long-term borrowing - Preliminary review of agenda items related to plant construction, investment or contribution - Review of debt management such as the development of business for sensible management - Preliminary review of issues delegated by the BOD 	4	6	15
Ethics Management Expert Committee	<ul style="list-style-type: none"> - Preliminary review of agenda items related to ethics management and shared growth - Preliminary Review conditions of issues delegated by the BOD 	3	-	-

Audit Committee

KOWEPO has been operating the Audit Committee since 2011 to conduct the performance and accounting audits for major projects. The Audit Committee is composed of a total of three committee members including one chair and two non-standing directors to secure the independence and specialty, and one of the committee members is an expert of accounting or finance according to relevant regulations.

Activities of the BOD

BOD Meetings

KOWEPO's BOD makes decisions on key issues related to economic, environmental, and social aspects such as the management goal and mid- to long-term financial management plans. The BOD convenes at the request of Chairman of the Board or more than one-third of the BOD members. KOWEPO discloses the composition of BOD, BOD meetings, and key decisions on its website and Alio, the integrated disclosure system for public institutions.

Type	2015	2016	2017
Number of Meetings (Meetings)	11	15	17
Reported and Decided Agendas (Cases)	39/19	52/14	40/14
BOD Meeting Attendance Rate (%)	97.8	92.1	96.6
Non-standing Member Attendance Rate (%)	96	86.1	82.3

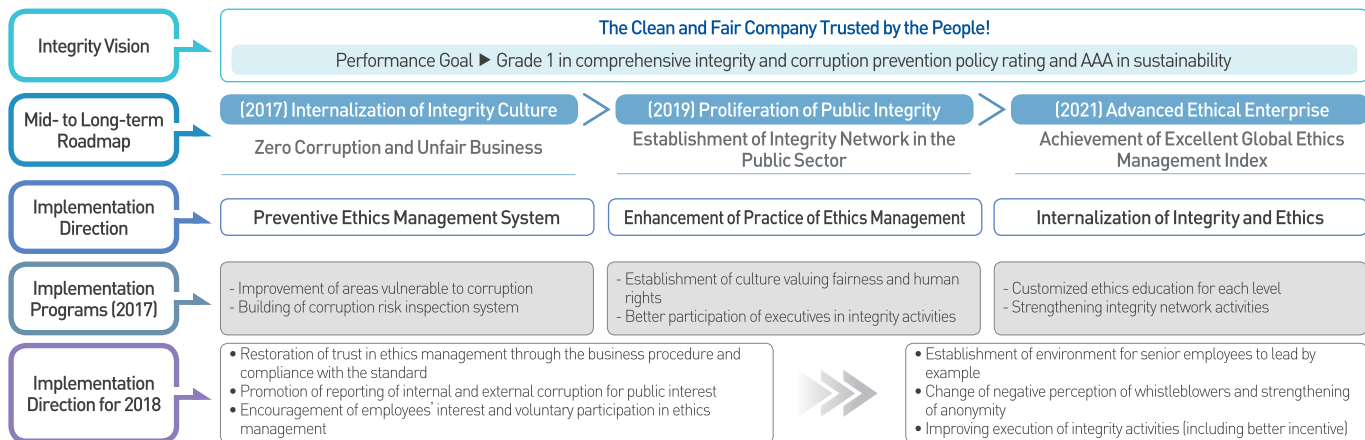
Evaluation and Compensation of the BOD

Directors of the board of KOWEPO are fairly evaluated and remunerated according to the performance of business operations. The CEO signs management agreements on management goals to be achieved during his or her term and key pending issues with the Minister of Trade, Industry and Energy, and a graded bonus system is applied to the CEO according to the result of management assessment by the government. The directors are remunerated as per regulations through the decision by the shareholders' meeting, and the annual salaries are disclosed transparently according to the related legislation and regulation. The average remuneration paid to the standing directors and non-standing directors is KRW 183.13 million and KRW 30.0 million, respectively, as of the end of 2017.

KOWEPO has continuously practiced ethics management since the “KOWEPO Code of Conduct” was proclaimed in October 2002 as the standards for the ethical judgment and behavior of its employees to become a global leader in ethics management. KOWEPO is committed to moving forward to be a global leading ethics management corporation trusted by the public.

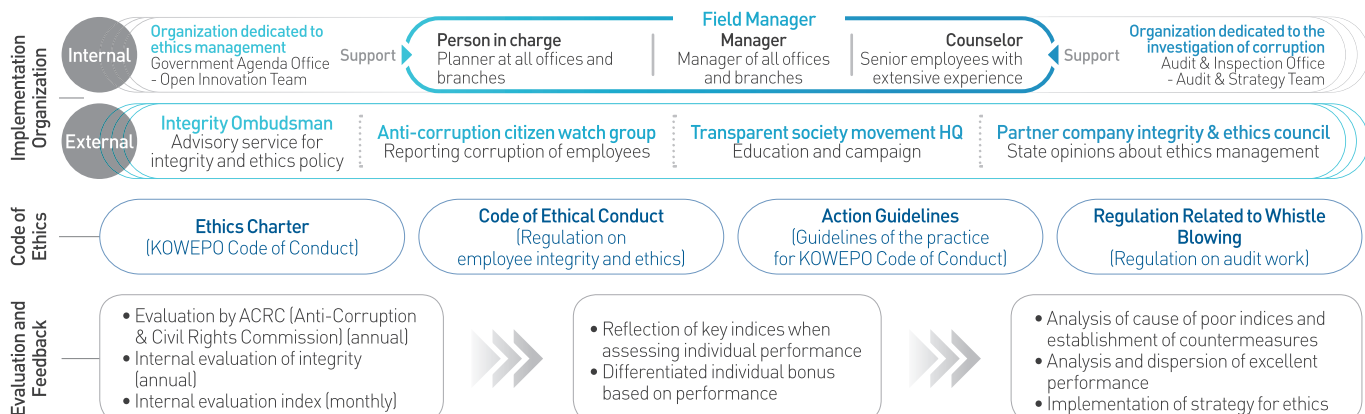
Ethics Management Vision and Strategy

Under the vision of “The Clean and Fair Company Trusted by the People!,” KOWEPO selected three major directions of the preventive ethics management system, strengthening ethics management practices, and internalizing integrity and ethical awareness and six implementation programs. We practice ethics management in compliance with international standards on anti-corruption management.



Implementation System

KOWEPO is operating the practice program with the dedicated organization and system to implement the ethics management effectively. The organization dedicated for ethics management is responsible for establishing and executing the detailed plan for implementation of ethics management, employee education on ethics management, dispersing corporate ethics culture, and registering the internal and external unethical cases.





ISO 37001 certification ceremony



Integrity and Ethics Education



Contest for Integrity and Ethics Practice



On-site briefing to share examples of unfair work order

Implementation Activities of Ethical Management

Acquisition of ISO 37001 Certificate for Anti-corruption

In recognition of active efforts and participation of its employees for establishing the integrity culture, KOWEPO's head office and power generation complexes in Taeon, Pyeongtaek, Seoincheon, and Gunsan acquired the ISO 37001 anti-corruption certificate for the first time in Korea in August 2017.

Ethics Education of All Employees

KOWEPO conducts lifecycle-specific ethics education from new hires to high-ranking employees to comply with the Improper Solicitation and Graft Act and internalize the ethical awareness. The education programs maximize the effect of integrity messages by breaking away from conventional one-way lecture and strengthening the integrity education through cultural experience and seek voluntary changes through emotional communication.

Holding of Contest for Integrity and Ethics Practice

KOWEPO held the Contest for Integrity and Ethics Practice for all employees at its headquarters in Taeon on January 13, 2017. Furthermore, KOWEPO formed a department dedicated to integrity and ethics to establish the organizational culture of transparency and integrity since the enactment of the Improper Solicitation and Graft Act. It has published the action manual to increase understanding of the law and is carrying out various programs such as the customized education and integrity events.

Publication of Casebook of Unfair Work Order

KOWEPO held the workshop to identify unfair work order cases in June 2017 and published the casebook in August to establish a fair and clean working environment. Moreover, it is holding a field briefing to share cases to establish a clean organizational culture and encourage voluntary lead-by-example of senior-level employees. KOWEPO intends to implement the anti-corruption policy that the public can experience by continuing its integrity programs to eradicate unreasonable practices in the viewpoint of outside stakeholders as well as internal unfair work orders and communicating with various stakeholders.

Operation of Fair Hiring Process

KOWEPO has been conducting the blind and NCS-based hiring process since 2015 to provide fair opportunities to applicants. In particular, KOWEPO deleted the gender and age information and photo attachment in the application form and reduced the details of education and experience in the application form to prevent prejudice against high school graduates at the application stage. Moreover, it selects the recruitment contractor through open competitive bidding to secure the objectivity of evaluation. As a result, the hires from areas outside of the capital region increased by 44.8%.

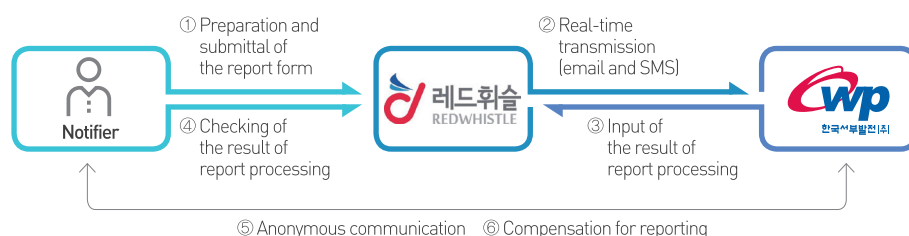


ISO 37001 certificate

Reporting and Notifier Protection Scheme

KOWEPO is operating the integrity and ethics counseling office to prevent irregularities of employees and establish a clean organizational culture and carries out the education and PR of reporting for public interest and whistleblower protection scheme. It also introduced the mobile report system using smart devices to assure anonymity of notifiers.

Anonymous Report Procedure



Outcomes of Ethics Management

Outcomes

- Selected as the outstanding institution for four consecutive years in anti-corruption policy evaluation by the ACRC
- KOWEPO's unfair work order casebook selected as top 10 anti-corruption policies by the ACRC in 2017
- Improved competitiveness and corporate image with ISO 37001 certification for anti-corruption management system

Key Indices of Ethics Management




		(Point)		
	Type	2015	2016	2017
Assessment of Integrity of Public Institutions	Overall Integrity	8.45	8.42	8.28
	External Integrity	8.83	9.01	8.87
	Internal Integrity	8.44	8.13	7.98
	Customers' Assessment of Policy	8.34	8.00	7.69
Assessment of Integrity by the Institution	External Integrity	9.90	9.87	9.70
	High-level Public Officials	9.99	10.00	9.98
	Middle Managers	9.89	9.89	
Anti-corruption Policy Assessment by the ACRC	Establishment of Anti-corruption Implementation Plan	86.3	85.0	85.0
	Establishment of Integrity Ecosystem	92.5	100.0	97.3
	Removal of Corruption Risk	100.0	98.2	93.6
	Establishment of Integrity Culture	93.6	100.0	97.0
	Effect of Integrity Improvement	98.2	70.0	85.0
	Proliferation of Anti-corruption Cases	97.7	100.0	100.0
	Deduction	100.0	-	△0.54

KOWEPO is operating the enterprise-wide risk management system to eliminate or avoid potential risks that can occur during the management activities for sustainable growth. In particular, it has identified 27 key risk indices in 15 areas and is monitoring them regularly so that it can effectively respond when an emergency situation occurs.

Enterprise-Wide Risk Management System

Identification of Key Risk Indices

KOWEPO defines and classifies the risk factors by reflecting the characteristics of power generation industry, internal and external requirements, and opinions. As such, it has identified 27 key risk indices in 15 areas and 3 sectors. In particular, it created seven indices in the environment, safety, social contribution, security, and ethics management to strengthen the management of risk factors that degrade the creation of public values.

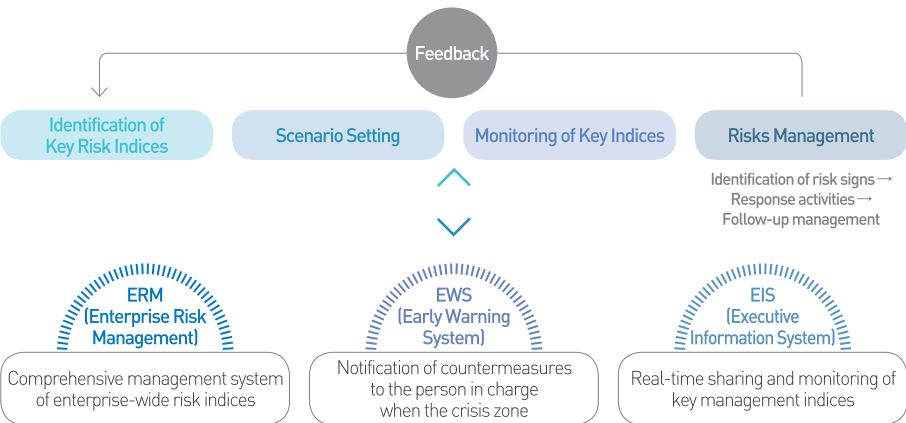
Business Management 		Business Management Procedure 		Public Interest Values 	
Key	Risk Indices	Key	Risk Indices	Key	Risk Indices
Income from Power Trade	Income from Sales of Power	Power Plant Operation	Failure Rate Unplanned Loss Rate		Fine Dust Reduction Rate
Budget Management	Operating Income Ratio	Fuel Management	Bituminous Coal Saving Rate Appropriate Inventory of Bituminous Coal	Environmental Management	Greenhouse Gas Emission Right
	Exchange Rate	Domestic (Share)	Ratio of Net Income to Net Sales Invested Project Construction Process Rate		Industrial Accident Rate
Financial Management	Interest Rate of Corporate Bond (Corporate Bond - Treasury Bond)		Overseas Business (Power Generation) Ratio of Net Income to Net Sales	Safety Management	Disaster Management Rate
	Debt Ratio	Overseas Business	Overseas Business (Resources) Ratio of Net Income to Net Sales Overseas Project Construction Process Rate		Complaint Processing Rate
	Taeon Income from Sales of Power Operating Income Ratio	New and Renewable Energy Management	RPS Obligatory Execution Rate New and Renewable Energy Construction Process Rate	Social Contribution	Information Security Achievement Rate
Power Plants Business Management	Pyeongtaek Income from Sales of Power Operating Income Ratio	Construction Management	Portion of Power Generation from New and Renewable Energy Process Rate	Security Management	Information Disclosure Rate
	Seoincheon Income from Sales of Power Operating Income Ratio	Technology Management	Development of Five Core Technologies Execution Rate	Ethics Management	
	Gunsan Income from Sales of Power Operating Income Ratio				

Managing Organizations

KOWEPO operates 19 teams in charge of risk management led by the Planning Department Finance & Budget Team and the emergency organizations such as the Company-wide Risk Management Committee, Foreign Exchange Risk Management Committee, and Project Selection Committee. Experts at working-level from relevant areas analyze counter-measures after identifying the risk factors of each area and quantifying the risk levels while the emergency risk management committees deliberate and decide risk response measures for each area as part of systematic risk management.

Risk Management Process

KOWEPO monitors and manages the risks in real-time through an online system and shares the information with all employees to disperse the risk management awareness company-wide.



Evaluating New Project Risks by External Experts

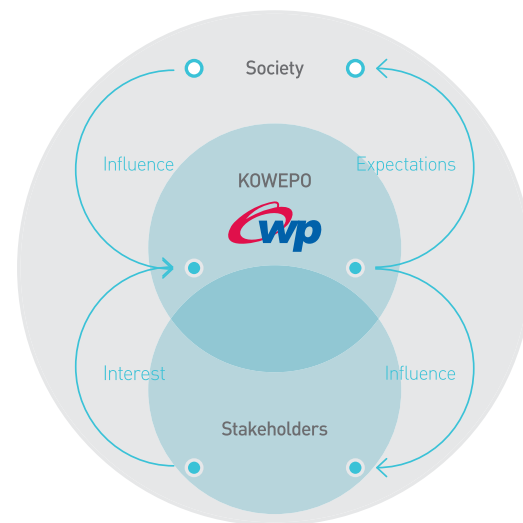
KOWEPO utilizes outside specialists with the expertise to secure financial soundness and minimize risks by accessing the feasibility of new projects.



Stakeholder Communication and Engagement

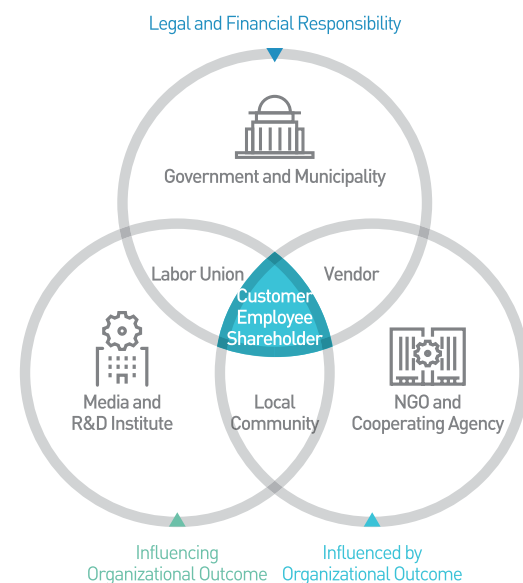
Stakeholder communication and engagement is the most critical part of sustainability management. KOWEPO communicates with internal and outside stakeholders continuously and strives to reflect their opinions in management.

Relationship of KOWEPO with Stakeholders and Society



Classification of Stakeholders

KOWEPO deduces the scope of stakeholders according to "Stakeholder Identification and Engagement" in ISO 26000 and classifies them according to the degree of responsibility, influence, accessibility, dependency, and representation.



Stakeholder Communication and Engagement

Stakeholder Communication Channel

KOWEPO has built and is operating various communication channels to gather the opinions of stakeholder for sustained growth.

	Customers	Employees	Shareholders	Government	Municipalities	Labor Union	Media	R&D Institute	Local Communities	NGO	Cooperating Agencies	Vendor
Website	•	•					•		•	•		•
Media PR	•						•		•	•	•	
Forum				•	•			•		•	•	
Council Operation	•		•	•	•	•		•	•	•	•	•
Interview	•					•	•		•			
Intranet		•				•						
Company Newsletter		•				•						
Social Media		•					•		•			
Survey		•							•	•		•
Alio Disclosure	•		•	•			•			•		
Conference	•		•	•	•	•		•	•		•	•
Road Show												•

Communication with Stakeholders

Communication with Outside Stakeholders

KOWEPO has established an open communication strategy with a focus on participation, sharing, and dispersion to promote communication with outside stakeholders and created the implementation organization for executive management and the dedicated monitoring organization.

Slogan	KOWEPO leads communication with stakeholders with the citizens' happiness at the highest priority!		
Open Communication Strategic Direction	Participation Building partnership with citizens	Sharing Transparent and quick information distribution	Dispersion Creation of future values together
Main Contents	<ul style="list-style-type: none"> Building of bidirectional communication channels Operation of communication channels Better acceptance of public needs 	<ul style="list-style-type: none"> Accurate and transparent information sharing Quick notification service Value creation with data disclosure 	<ul style="list-style-type: none"> Cooperation for sustainable future Creation of the virtuous cyclic environment for self-sufficiency Sharing and feedback of outcome
Communication Targets	Vendors, residents, and citizens	Citizens and residents	Citizens and residents
Communication Channel	Workshop for shared growth with vendors, Citizen Communication and Sharing Day Open Communication Lounge Customer suggestion, Innovative idea contest, etc.	Information disclosure through AlioSNS, electronic board, newsletter Briefing, forum, workshop, etc.	WP Social Value Implementation Committee Climate Change Response Council Exhibition of excellent cases, etc.

Open Communication Agendas (10) in Three Key Issues

Environment and New & Renewable Energy

Reduction of fine dust around power plants, increased acceptance of new & renewable energy projects, etc.

Communication Channel I
Citizens Communication and Sharing Day, etc.

Promotion of Local Economy

Expansion of greenhouse gas reduction projects, building of the self-sufficient economic model to utilize hot drainage, etc.

Communication Channel I
Local Business Council, etc.

Cooperation for Safety and Shared Growth

Prevention of accidents involving the neglected group, the operation of open R&D projects, etc.

Communication Channel I
Safety Management Committee, etc.

KOWEPO selected three issues and ten agendas that require communication in 2017.



WP Social Value Implementation Committee



Citizen Communication and Sharing Day



Second and Third Tier Vendor Council

WP Social Value Implementation Committee

KOWEPO launched WP Social Value Implementation Committee on December 6, 2017 to implement the national government policies and lead realizing innovations and social values. The Committee is chaired by CEO of KOWEPO, 24 inside members, and 17 outside members from NGOs, public institutions, academia, and community representatives. KOWEPO created Open Communication Lounge in its headquarter building in Taean and regularly holds the general meeting and subcommittee meetings as part of continuous communication and cooperation. Moreover, KOWEPO formed Open Communication Advisory Group and launched the Implementation Committee for each power generation complex in 2018. It plans to implement the social value-linked projects through the Open Communication Advisory Group from the beneficiary effectiveness aspect and continue to identify the open innovation programs for it.

Citizen Communication and Sharing Day

KOWEPO has been holding the Citizen Communication and Sharing Day by inviting local residents, environmental groups, and public institutions since 2017. In May 2018, it invited stakeholders to the Power Generation Division in Taean for the bidirectional communication event to share the fine dust reduction outcome and gather the opinions of local communities.

Second and Third Tier Vendor Council

KOWEPO has been operating the Second and Third Tier Vendor Council since 2011 to promote fair trade between large and small enterprises, interchange of technical information, and joint technology development. The Council is for the small enterprises which supply products and services to the first tier vendors and formed of 23 sub-councils and 175 member companies. More than 100 people including the representatives and officials of 80 small companies attended the general meeting in 2018 for briefing of the Act on the Promotion of Collaborative Cooperation between Large Enterprises and Small-Medium Enterprises and sharing on the policies and systems such as the measures to prevent leakage of industrial technologies, employment stabilization fund, and programs available from SMBA.

Communication with Inside Stakeholders

KOWEPO operates a wide range of communication channels to promote communication with its employees. The opinion suggestion program, in particular, is very popular as evidenced by 16,457 cases registered in 2017, and the programs such as U-Center, Red Whistle, Survey, and Ombudsman to eliminate the blind spot of communication.

Type		Communication	Channl	Contents	
				2016	2017
Online	Bottom-up	Suggestion	Improvement of irrational practice, improvement of productivity, upgrade of the working environment, etc.	15,378 cases	16,457 cases
		U-Center, Red Whistle, and Survey	Facility improvement, wage, welfare satisfaction survey, report of corruption, etc.	Always	Always
	Bidirectional	I Love Reply	Free discussion room, Sharing of information related to personal financial know-how, daily living tips, etc.	372cases	335cases
		SNS Group Room	Sharing of labor union schedule, current issues, etc.	Always	Always
Offline	Bottom-up	Ombudsman and Briefing	Transfer of work site, company housing, current business issue, etc.	Always	Always
		CEO Post Office and Lunch Box Meeting	Direct listening of employee complaints and lunch meeting between management and employees	Always	Always
		Labor-Management Council and Workshop	Operation of Council at HQ and power complexes and sharing of labor relationship issues	32cases	28cases
		Mentor-mentee system and Clubs	Mentoring between senior and junior level employees and cultural clubs	Always	Always
	Bidirectional	Special Management-Labor T/F Team	Wage, benefits, wage peak scheme, etc.	New	13 meetings
		Vendor Council	Listening to opinions of vendors and improvement of working condition	New	9 meetings
		Social Value Implementation Committee	Fine dust reduction, locally specialized income creating project, etc.	New	18 meetings

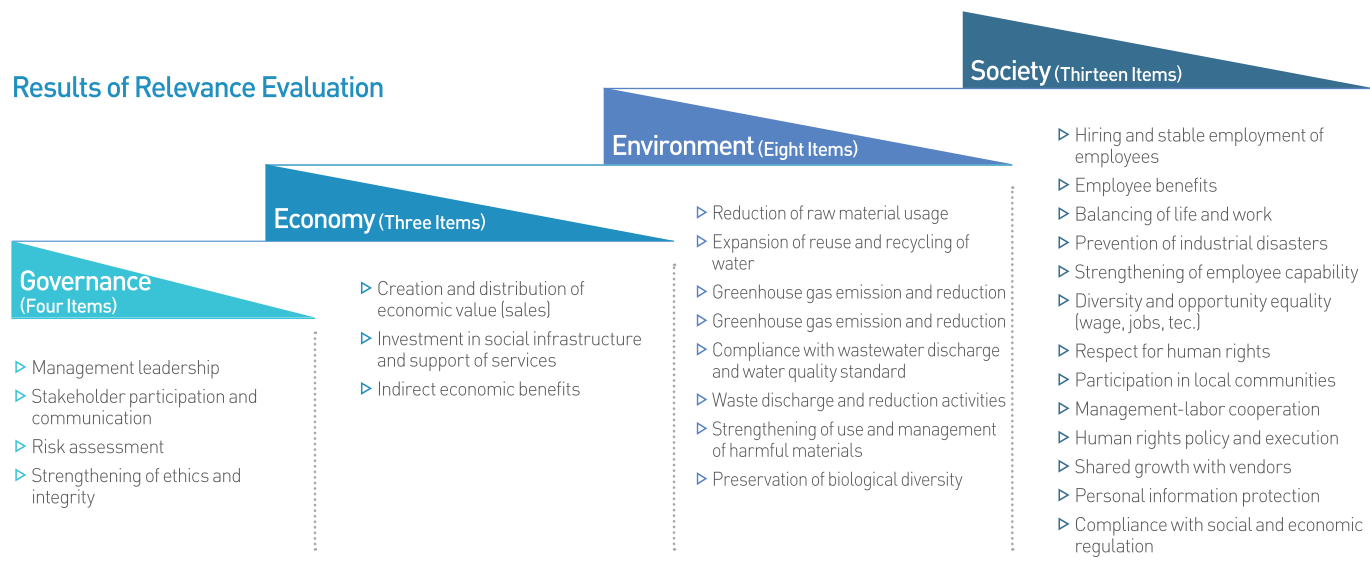
KOWEPO seeks the sustainable development by broadly reflecting the management issues in economic, social, and environmental aspects. KOWEPO selected the key issues according to the materiality assessment method recommended by ISO 2600 and GRI Standards to focus on issues important to employees and stakeholders.

Materiality Assessment Process

KOWEPO conducts the internal/external environmental analysis and materiality assessment based on the sustainability context, materiality, and completeness basis and participation of stakeholders as recommended by GRI for deducing the key sustainability management issues.

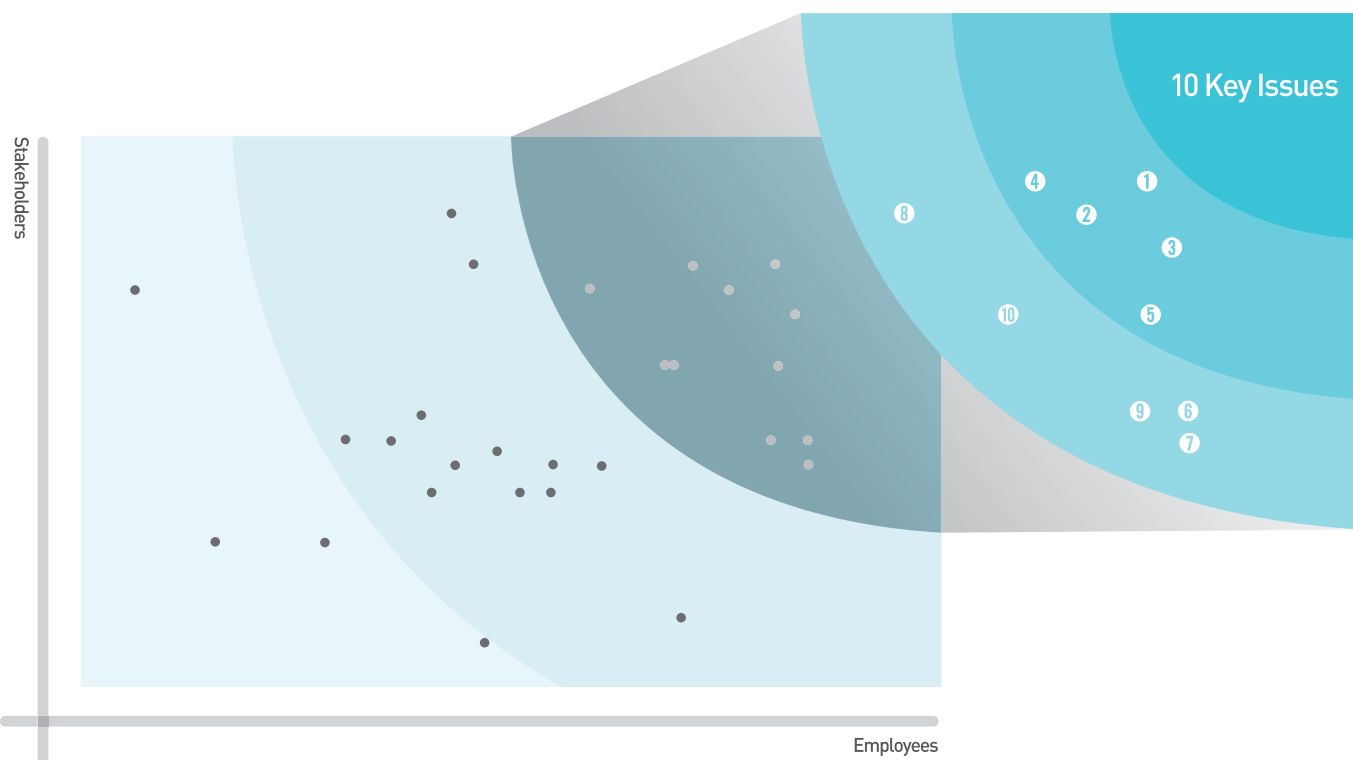


Results of Relevance Evaluation



Results of Materiality Assessment

KOWEPO selected 28 items for survey questionnaire based on the relevance evaluation results and selected 10 key issues after conducting the materiality survey of its employees and outside stakeholders.

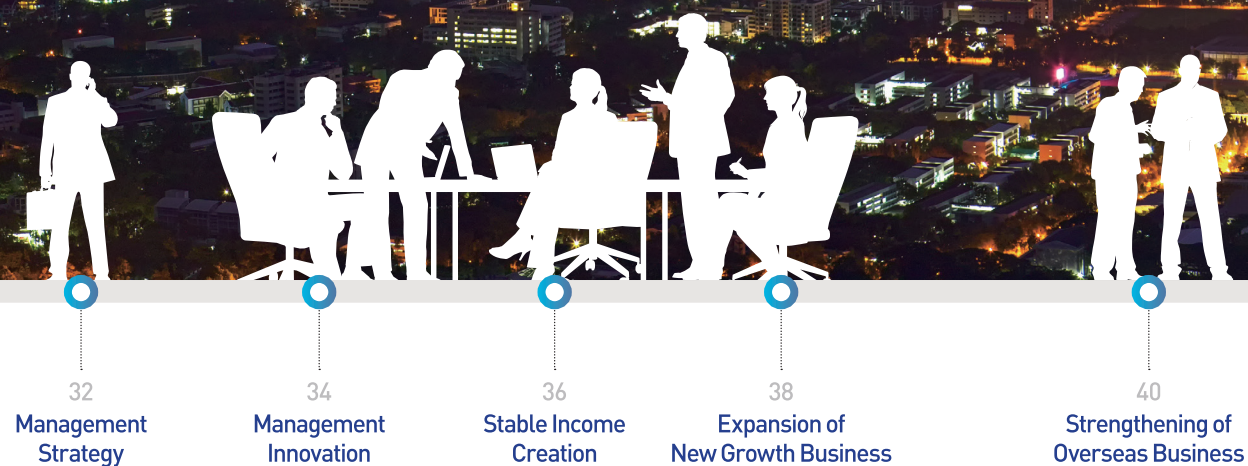


10 Key Issues

(Point)

Seq.	Area	Issue	Employees	Stakeholders	Key Stakeholders
①	Environmet	Harmful material usage and management	4.25	4.84	Government, communities, and employees
②	Environmet	Fine dust emission and reduction	4.26	4.77	Fine dust emission and reduction
③	Environmnt	Greenhouse gas (energy) emission and reduction	4.20	4.81	Government and communities
④	Society	Prevention of industrial accident	4.17	4.84	Employees and vendors
⑤	Society	Safety of products and services	4.25	4.71	Government, shareholders and communities
⑥	Society	Compliance with social and economic regulations	4.27	4.61	Government, communities, and vendors
⑦	Society	Personal information protection	4.28	4.58	Government and communities
⑧	Governane	Leadership by management	4.07	4.81	Government, shareholders, and employees
⑨	Society	Stable employment	4.24	4.61	Government, communities, and NGOs
⑩	Environmnt	Waste discharge and reduction	4.15	4.71	Government, communities, and NGOs

KOWEPO has reestablished its management strategy
Vision 2030 that reflects the paradigm shift of
the energy industry to expand the new growth business and
strengthen overseas business for sustained growth.



Performance (As of the end of 2017)

Sales



KRW **4.222**
trillion

Sales from Overseas Business



KRW **30.0**
billion

Investment in R&D



KRW **12.8**
billion

Average Education Time per Person



143 hours



42

Leadership
in the Fourth Industrial
Revolution

44

Building R&D Platform
Centered on Customers

Economy

KOWEPO Vision 2030

Corporate
Philosophy

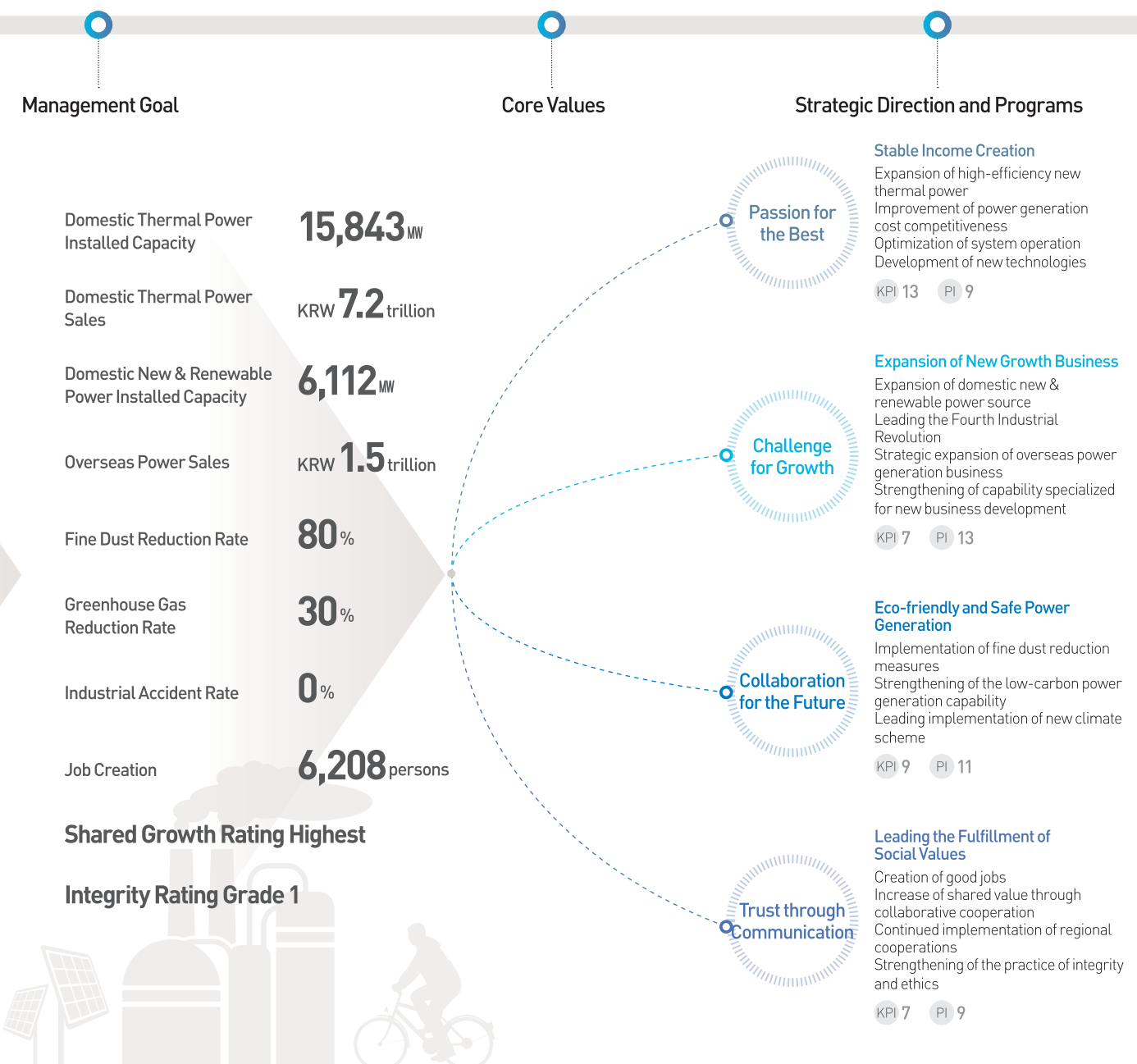
To create the best energy
by harmonizing humankind,
technology, and environment.

Vision

Beyond Energy, Create Happiness
The energy company creating
citizens' happiness

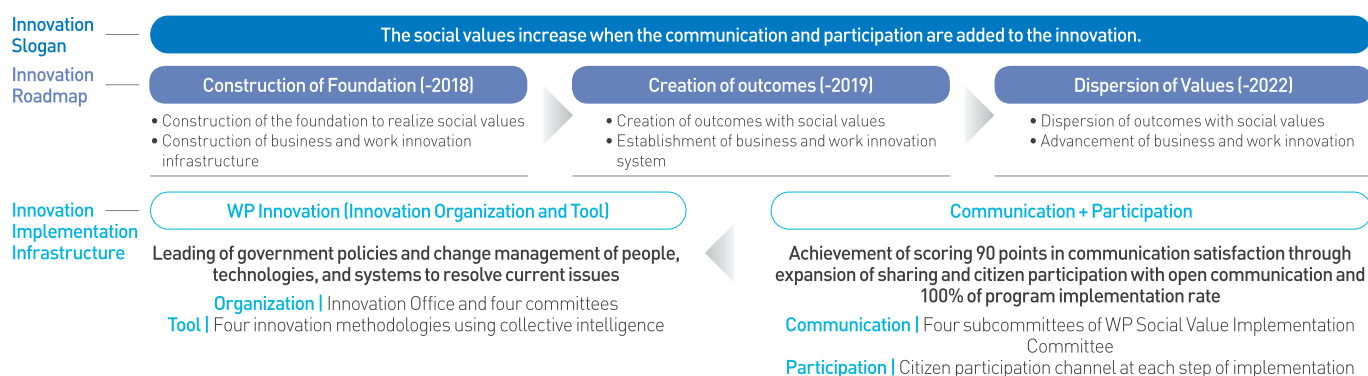


Since establishing Vision 2025, KOWEPO has faced the change of business environments such as accelerated slowing down of domestic power demand growth, power supply structure change centered on eco-friendliness and safety, spread of technology innovation by the Fourth Industrial Revolution, and emphasis on fulfilling social responsibilities of public institutions. To prepare for a better future through change and innovation, KOWEPO established KOWEPO Vision 2030 by reflecting the government's energy policy and opinions of inside and outside stakeholders. KOWEPO is committed to growing into the differentiated power company to lead the energy market and broaden its presence by leading the fulfillment of social values through the achievement of KOWEPO Vision 2030.



Establishment of Management Innovation Implementation System

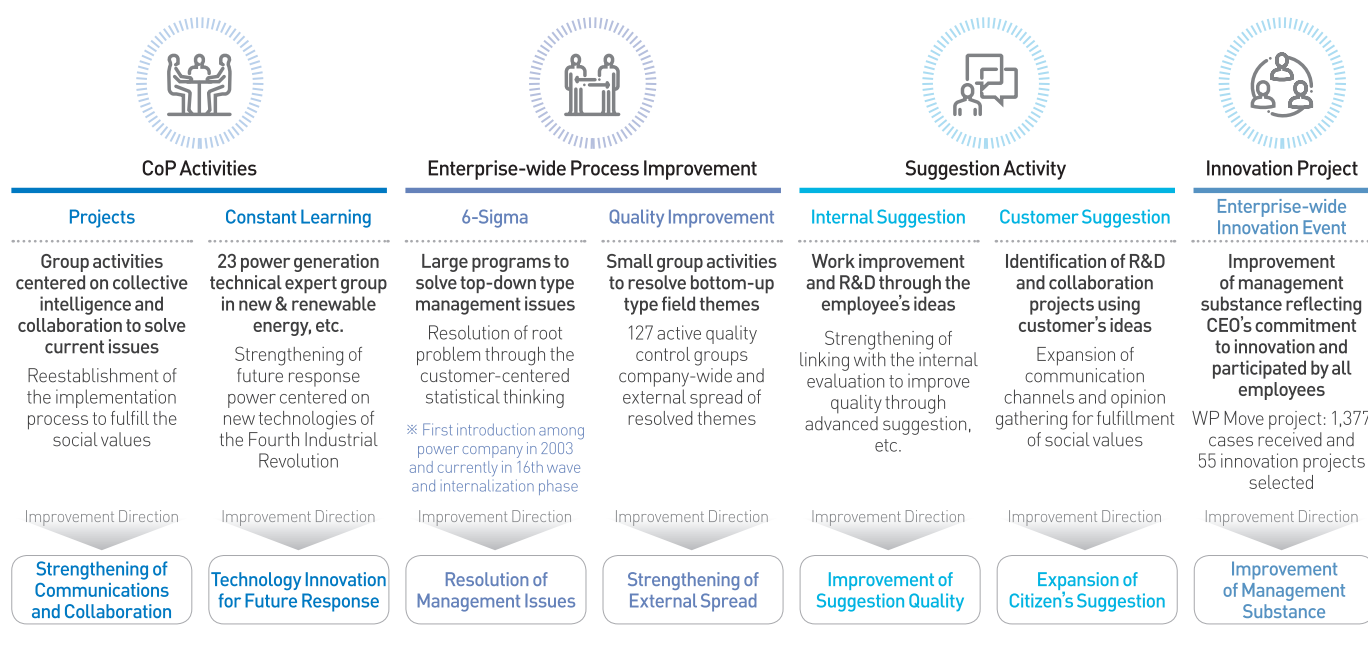
KOWEPO is striving to maximize the business performance through the management environment changes by establishing the management innovation system. We expanded the management innovation domain for the advancement of management innovation system to the public service domain to fulfill the social values and launched the public institution's first "WP Social Value Implementation Committee" in December 2017 to actively reflect the opinions of the stakeholders. We are fulfilling the social values that the public can experience through the open communication with residents, NGOs, and vendors. Moreover, we unified the national affair tasks such as innovation programs that had been spread through various organizations and built the collective intelligence utilization system centered on communication and collaboration through linking of innovation implementation organizations and strengthening the participation of citizens.



Promotion of Management Innovation Implementation

Construction of Innovation Ecosystem Based on Utilization of Internal and External Collective Intelligence

KOWEPO strives to build the more productive innovation ecosystem by utilizing the internal and external collective intelligence to implement totally new innovations.



STEP 1 Identification of Projects**Communication and participation**

Gathering of citizen's opinions, contest, etc.

Citizen participation channel

WP Social Value Implementation Committee, etc.

STEP 2 Selection and Implementation**Communication and participation**

Participation of expert advisory group in selection and sharing

Citizen participation channel

Citizen opinion group, advisory group, council, etc.

STEP 3 Sharing and Feedback**Communication and participation**

Citizen evaluation and review, sharing of BP cases, etc.

Citizen participation channel

Citizen opinion group, advisory group, and contest council, etc.

WP-MOVE project to improve the management substance

KOWEPO is carrying out the WP-MOVE project to achieve the management goal. The WP-MOVE project is the innovation project with the goal of Motivating the employees for innovation, Optimizing the business process, Vitalizing the organizations, and Evolving into the best energy company. KOWEPO selected 55 innovation programs from 1,377 suggestions through the feasibility review by experts and then will evaluate the projects and award them at the end of 2018. The key implementation programs such as WP-2030 Clean Air Project that includes the expansion of fine dust reduction measures, which are currently limited to coal-fired thermal power, to heavy oil thermal power and combined cycle thermal power and the drastic increase of the reduction target and WP Carbon Mileage which offers incentives to employees' voluntary carbon reduction activities. Moreover, KOWEPO has initiated various programs to restructure itself into the eco-friendly business by implementing "New & Renewable Energy 3020." They include securing the technologies and sites such as the reclaimed regions, mud flat, and seawater fish farm; developing the new & renewable business model based on resident participation using the private equity fund led by local financial sector; and commercialization of virtually integrated, ultralight wind power generation technologies.

Construction of foundation for citizen participation and collaboration at each step of innovation programs

KOWEPO is carrying out the innovation activities that the public can experience under the leadership of the WP Social Value Implementation Committee by gathering the needs at each step such as collecting citizens' opinions, strengthening advice from outsiders, and citizen participation in deliberation. The first step of identifying projects systematically manage the citizens' suggestions and reflect them in business by expanding the communication channels with citizens such as Innovation Idea Contest, WP Citizen Suggestion Card, and WP Citizen Suggestion Lot. The second step of selecting and implementing projects enhances the advice from outsider's viewpoint, and the third step of sharing and feedback strengthens feedback and sharing the outcome with the public by introducing the citizen evaluation system of the project outcomes.

Expansion of compensation for innovation activities

KOWEPO operates the incentive scheme under the comprehensive performance compensation rule to provide motivation for innovation activities. It includes linking awards with human resource system, financial performance compensation, awards for creative ideas, overseas training, and mileage.

Strengthening of Capability for Future Innovation Growth

KOWEPO is committed to growing into the energy company leading the future power generation industry through the continuous expansion of future growth engine, strengthening of global level engineering capability, and continuous investment in R&D and human resource development based on the company-wide management innovation.



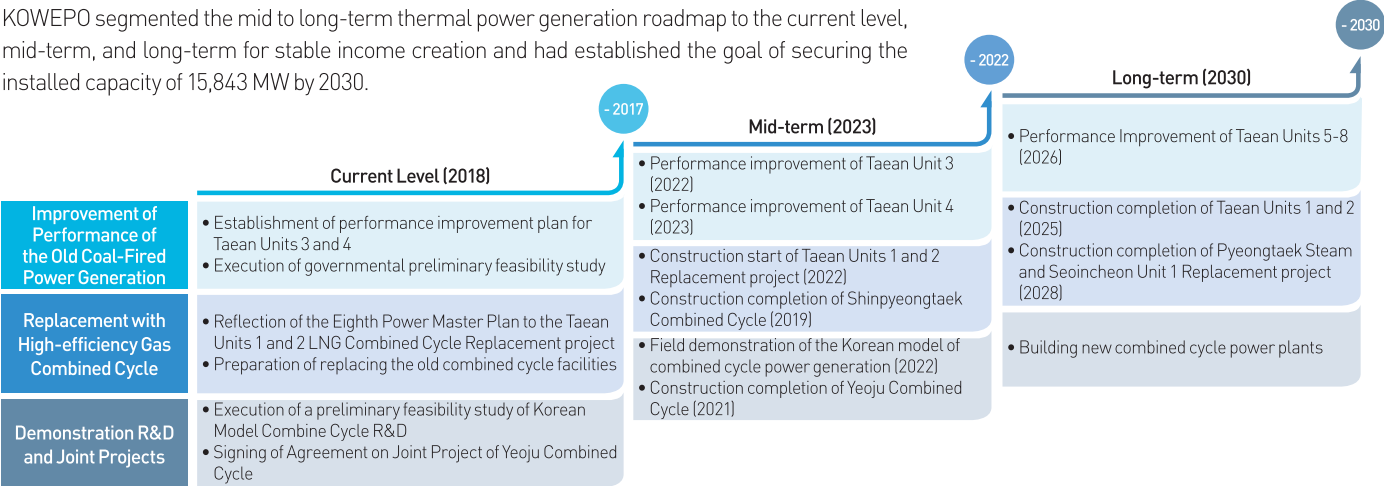
1st general meeting and expert advisory group initiation ceremony for 2018



WP-Move project kick-off meeting and briefing at HQ

Mid to Long-term Roadmap

KOWEPO segmented the mid to long-term thermal power generation roadmap to the current level, mid-term, and long-term for stable income creation and had established the goal of securing the installed capacity of 15,843 MW by 2030.



Prompt Implementation of Domestic Thermal Power Projects

Sequential implementation of performance improvement of the old coal-fired thermal plant to secure stable income base

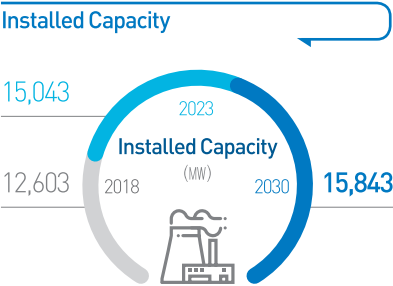
KOWEPO is carrying out the project that increases the boiler steam temperature (538℃ → 600℃) and optimizes core systems such as the turbine and feedwater heater to improve the efficiency of the old coal-fired thermal power plants by 2.4%p.

Increase of profitability by promptly replacing old system with high-efficiency gas combined cycle systems

KOWEPO strives to improve the profitability by replacing the old combined cycle system with low utilization rate with high-efficiency power generation system such as converting Taeon Units 1 and 2 into gas combined cycle plants.

Development of demonstration R&D project and joint projects to take an early lead in domestic gas turbine operation

KOWEPO will secure the domestic gas turbine operating know-how by carrying out the demonstration R&D project and create continuous income by entering the overseas O&M markets.



Smart and Distributed Purchase of Bituminous Coal

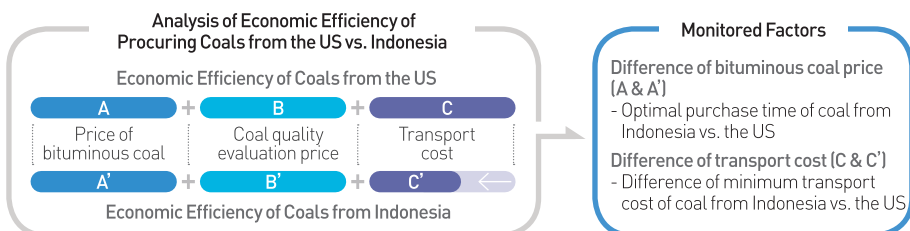
Saving of bituminous coal purchase cost by monitoring the global market change

KOWEPO changed the bituminous coal procurement and optimized the shipping country combination (South African second shipment + Australian second shipment). As a result, we saved the procurement cost of KRW 490 million.

Type		30 Days	60 Days	90 Days	Total Volume (10,000 tons)	CFR (USD/ton)	Total (Volume x CFR)
Existing	Australia(Long-term Chartered Ship)	165,000 tons	165,000 tons	165,000 tons	49.5	93.03	USD 46,049,850
	Australia (Commodity Chartered Ship)	82,500 tons	82,500 tons	82,500 tons	49.5	85.87	USD 45,614,250
Change	South Africa (Long-term Chartered Ship)	165,000 tons	165,000 tons	165,000 tons	33.0	95.29	[Saving of USD 435,600]

Economic efficiency by securing high-quality and low-calorie coal

KOWEPO had been procuring low-quality and low-calorie coal mostly from Indonesia but decided to procure high-quality and low-calorie coal mostly from the US after analyzing the quality and economic efficiency and saved the total cost of KRW 60 million.



Management for Each Lifecycle

Power generation system analysis
/ Management specific to each lifecycle



Prevention of Similar Failures

Development of reoccurrence prevention system / Sharing and feedback of failure information



Elimination of Human Error

Strengthening of emergency response capability / Improvement of diagnosis and maintenance capability



Utilization of Predictive Diagnosis Technology

Development of predictive diagnosis system / Construction of predictive diagnosis room

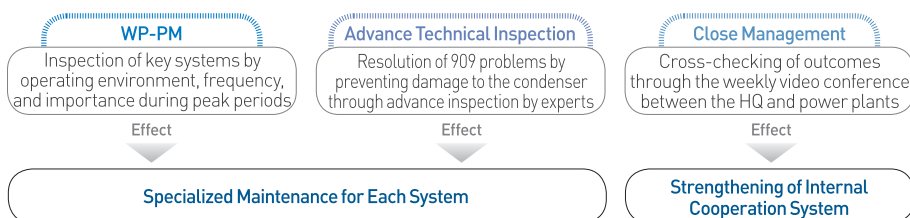


Focused Management of Four Factors to Prevent Failure

KOWEPO has selected four factors including the lifecycle management, prevention of similar failures, elimination of human error, and predictive diagnosis technology to minimize the shutdown from failure. The key activities includes the elimination of threats by categorizing the failure type according to the lifecycle of power generation system and establishing the countermeasures for each type, early stabilization by analyzing the failure type of previous units and establishing the preemptive countermeasures, selection of system vulnerable to severe failure that reflects the analysis of the failures in the past five years, and continuous identification of improvement and reinforcement measures. Moreover, it tries to minimize the shutdown time due to the failure of power generation systems by reinforcing the old system through identification and improvement of potential risk factors and generating the technical information report (TIR) that tracks the bidirectional failure data. As the results of such efforts, KOWEPO recorded the unplanned loss rate of 0.066% which was the historically low level in 2017.

Strengthening of Failure Prevention during Peak Period

KOWEPO analyzes the cause of failure during the peak periods in the past three years and manages the key items to reduce the risk of failure of power systems during the period and has upgraded the preventive inspection by developing KOWEPO standard maintenance model (WP-PM*) and advance technical inspection.

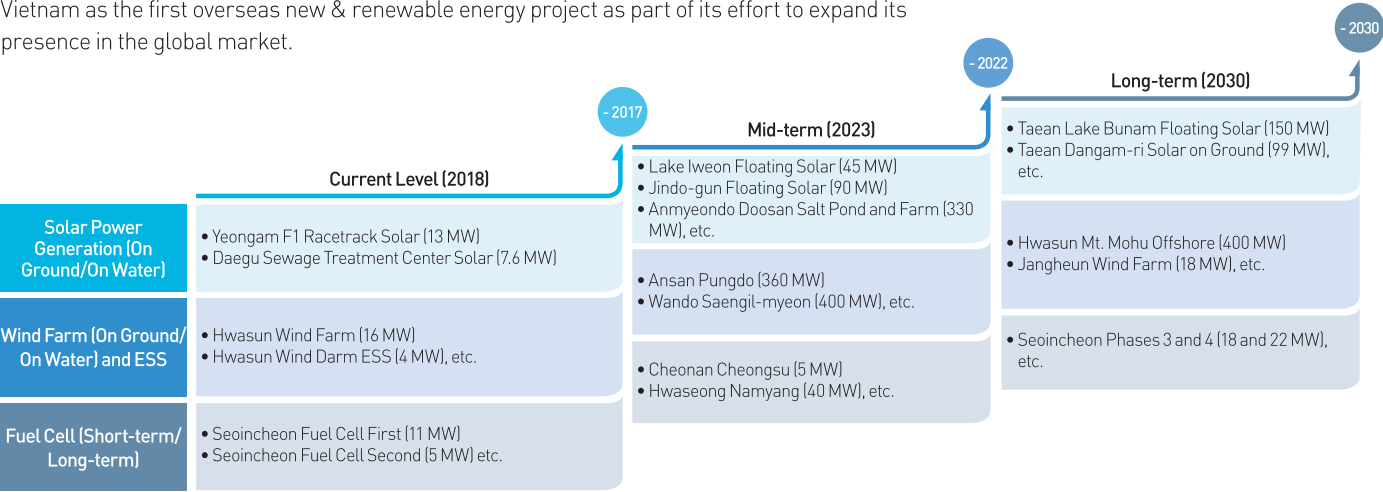


* WP-PM: The maintenance model that optimizes the maintenance items and interval according to the operating environment received the EPRI Technical Transfer Award for the first time in Asia

We also operate the dedicated technical support team to build the collaboration and technical support system with relevant institutions and formed the mobile combined cycle support team to prepare for failures of combined cycle systems. In addition, we operate the mobile standby teams during the vulnerable period to upgrade the mobile failure preventive activities. As a result, the number of failures during the peak periods decreased by two to five in 2017, and there was no major failure during the severe cold and hot seasons.

Establishment of New & Renewable Energy 3025 Roadmap

In step with the government’s policy to expand new & renewable energy, KOWEPO established the New & Renewable Energy 3025 Roadmap that stipulates the investment of KRW 9.3938 trillion to increase the portion of power generation from new & renewable energy to 25%. According to the Roadmap, the installed capacity of KOWEPO’s new & renewable energy facilities will be 6,112 MW, and the power generation from new & renewable energy will increase to 18,758 GWh by 2030. KOWEPO intends to build the balanced new & renewable energy portfolio by developing various new & renewable energy sources such as solar energy, wind energy, fuel cell, ESS, and bio. KOWEPO cooperates with local municipalities and residents for development of new & renewable energy through participation and profit sharing as the way to solve the local acceptance problem faced by large-scale new & renewable energy projects. KOWEPO signed MOU with Shinsung Solar Energy, which is the domestic solar energy module manufacturer, to jointly develop the solar power generation project in Dak Nong Province in Vietnam as the first overseas new & renewable energy project as part of its effort to expand its presence in the global market.



Development of Large-scale New & Renewable Energy Projects

New & renewable business model converging tourism

KOWEPO has been constructing on-ground solar (about 20 MW) and floating solar (about 2 MW) using the existing facilities such as idle lots in power plants, roof of coal warehouse, seawater and cooling water intake path in power plants and utilizing the accumulated know-how to establish the business model that converges the new & renewable energy and tourism business. KOWEPO’s tourism converged business models minimize environmental destruction by installing the systems on water and idle ground and develop new local attractions by creating water landscape, waterside square, and tracking course. Moreover, it intends to increase acceptance of power generation facilities through the operation of communication council and the profit sharing by donating and assisting the solar power generation systems to residents. Such tourism converged new & renewable energy business models by KOWEPO include Taeon Lake Iweon Solar (45 MW), Anmyeondo Amadeus Solar (330 MW), Anmyeondo Byeongsulman Solar (22 MW), and Taeon Iweon Reclaimed Land Solar (400 MW).

Offshore wind farm projects participated by residents

After benchmarking the offshore wind farm projects in leading countries, KOWEPO has launched the offshore wind farm projects with resident participation that uses the area of the offshore wind farm not only for generating power but also for fishery industry such as developing the multi-purpose fish farm and establishing the fishery resources. The currently active projects include Ansan Pungdo Offshore Wind Farm, Shinan Jaeun Offshore Wind Farm, and Wando Offshore Wind Farm.

Fuel cell projects

KOWEPO is carrying out the fuel cell projects of about 280 MW in idle grounds in power plants (Seoincheon and Gunsan) and urban areas demanding for heat (Busan Jeonggan, Daejeon Hagha, Cheonan Cheongsu, etc.). The fuel cell project is the new energy project with high utilization rate (90% or higher) and REC weight factor (REC=2.0), and we expect they will contribute significantly in increasing obligatory RPS implementation. It discharges almost no environmentally harmful substance since it uses the clean LNG as fuel, and it can be installed in urban areas as the alternative to the distributed power source, nuclear, and coal-fired thermal power generation. Moreover, supplying low-cost heat source will ease the burden of local residents and cope with the government energy policies centered on new & renewable energy.

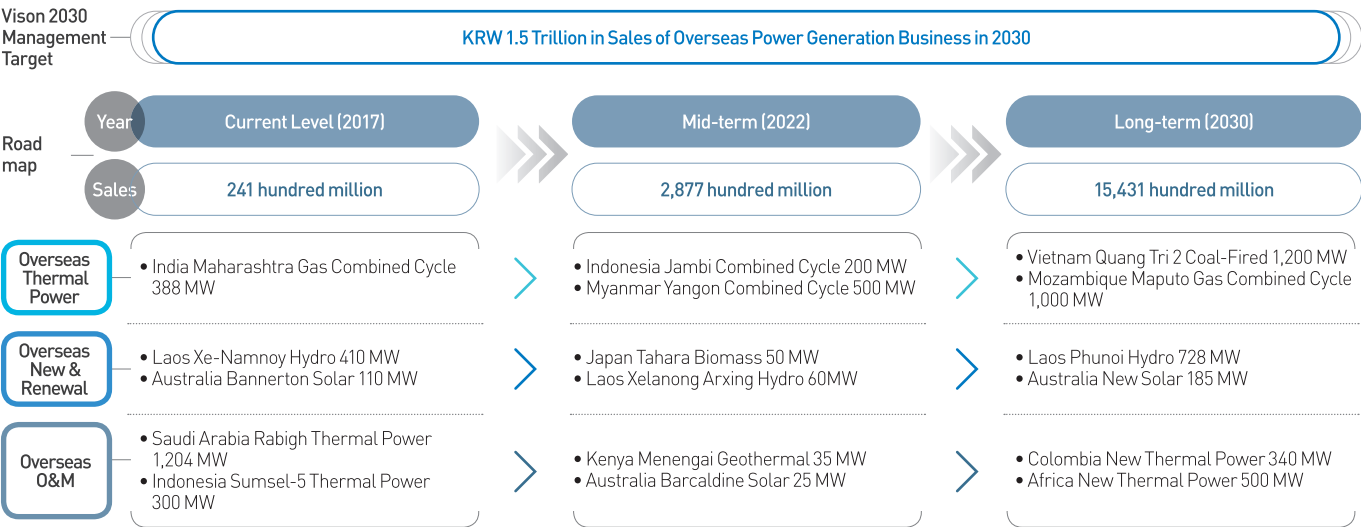


Nighttime View of Taeon Lake Iweon Floating Solar Power Plant

Mid- to Long-term Overseas Business Target and Roadmap

KOWEPO is actively trying to enter the growing overseas power generation markets to achieve the company management target.

Overseas business target



Status of Overseas Business

Overseas O&M Business

Saudi Arabia Rabigh O&M

The Rabigh Power Plant is the largest privately funded power plant in Saudi Arabia. The heavy-oil thermal power plant has the power generation capacity of 1,204 MW. KOWEPO owns 40% of the O&M company which conducts the O&M of the power plant for 20 years from 2013 to 2033. The O&M company was able to overcome the difficulties due to the low-quality Chinese EPC at the beginning of the operation and has been maintaining a high utilization rate of more than 90% and creating the stable income.



Laos Xe-Namnoy Hydro O&M

KOWEPO owns 100% of the O&M company which began the preparation of test operation of the hydraulic power plant with the capacity of 410 MW. It is preparing for the test operation and full plant operation by incorporating and hiring local personnel to conduct the process timely.

Operation technical support (TSA) for Indonesia Sumsel-5 Thermal Power Plant

Sumsel-5 Power Plant that began commercial operation in January 2017 is a 300 MW coal-fired thermal power plant. KOWEPO was able to minimize failure and secure stable sales by focusing on management of vulnerable system at the beginning and providing technical support such as the precise diagnosis. Utilizing the experience and accumulated network, KOWEPO is developing new power generation projects such as 200 MW gas combined cycle in Jambi in Sumatra and 62 MW hydraulic power.

New Business Development

Australia Bannerton Solar Power Plant

KOWEPO was the first Korean power business group to enter Australia's new & renewable energy market and is constructing 110 MW solar power plant in Bennerton, Victoria. KOWEPO invested KRW 4.1 billion for 6% equity share and expects total sales of KRW 30.0 billion for 25 years.

Kenya Menengai Geothermal Power Plant O&M

KOWEPO used its technology competitive superiority to enter the geothermal power generation business in Kenya that has high growth potential and is establishing the base to expand the African business. We expect the sales of KRW 2.3 billion annually for 25 years and plans to create stable income from the power market in east Africa by acquiring equity shares after booking the O&M project which has the relatively low risk.

Vietnam Quang Tri 2 Coal-Fired Power Generation

Quang Tri 2 Coal-Fired Power Plant in Vietnam is a supercritical, high-efficiency power plant with the capacity of 1,200 MW. KOWEPO has the equity share of about 25% and plans to construct and operate the world's top level power plant by utilizing its construction and O&M experience with coal-fired thermal power plants. This project is expected to be part of Vietnamese Master Plan for Power Supply and Demand at the end of 2018, and KOWEPO will implement the project by forming a consortium with a domestic partner.

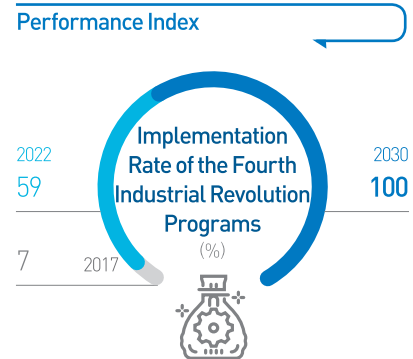
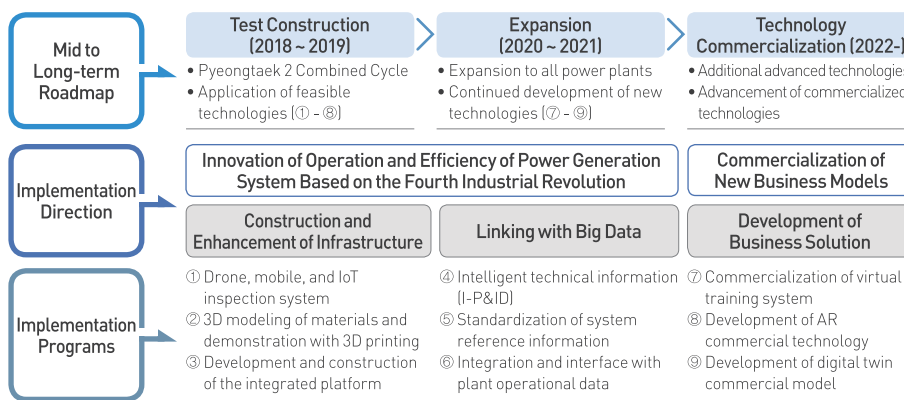
Laos Phunoi Hydro Power Generation

This project is the latest project added based on KOWEPO's experience of development, construction, and O&M of a hydraulic power plant in Laos. KOWEPO signed the MOU for joint project development with CEWA, an affiliate of CP Group that is the largest business group in Thailand, and verified the commercial value through the feasibility study and site survey. We plan to sign an agreement for joint development with an additional business partner to implement the project.

Leadership in the Fourth Industrial Revolution

Mid to Long-term Roadmap for the Technology Innovation of Fourth Industrial Revolution

KOWEPO is implementing the WP-Smart Plant strategy to lead the power generation industry through technology innovation in the Fourth Industrial Revolution. WP-Smart Plant is the system that allows the employees to acquire data and give work order related to power generation systems using smart devices. Its purpose is to enhance the productivity and efficiency of power plant operation. KOWEPO has established the mid- to long-term roadmap in three stages of Test Construction - Expansion - Technology Commercialization and focusing the company-wide competence on it. In details, we are implementing three strategies of infrastructure construction and advancement and nine programs including intelligent technology information. The future plans of technology innovation include the development of predictive diagnosis technology based on big data-based AI. KOWEPO plans to develop the high value-added business models in the power industry by converging the accumulated power plant operation know-how and future new technologies.



Application of the Fourth Industrial Revolution Technologies

Smart inspection system applying drone

KOWEPO utilizes drones equipped with high-performance, high-resolution zoom cameras to inspect the blind spots of power generation maintenance, such as the state of the lightning conductor on top of the chimney, floating light for private navigation routes, and stack on top of the boiler building that are usually difficult to access. KOWEPO developed the system to transmit and receive real-time images with the drone in 2018 to inspect the power generators remotely and enhance the capability to manage disasters. Moreover, it selected 45 employees and trained them for piloting to strengthen the drone operating capability.



Smart Inspection System Applying Drone

Construction of virtual training system applying VR and AR

KOWEPO developed the virtual training system applying the virtual reality (VR) and augmented reality (AR) to train the personnel on power generator disassembly maintenance in the same way as the field training. KOWEPO's virtual training system allows the trainees to disassemble and assemble the equipment and freely move inside outside to observe the appearance and detailed parts using the 3D images on the VR system. Moreover, it interfaces with the big data of operation manual, maintenance history, and drawings to help users check the technical information quickly and input or delete the data freely. KOWEPO has applied to patent the unique technology of the system and is continuously expanding the contents.



Virtual Training System

M&P Center with Intelligent Predictive Analysis System (iPAS)

KOWEPO constructed the M&P (Monitoring & Prognostic) Center to perform the analysis, diagnosis, and prevention of failure of power generation system and held the opening ceremony attended by about 30 KOWEPO and constructor officials in February 2018. The M&P Center uses the iPAS Universal (Intelligent Predictive Analysis System Universal) system jointly developed by KOWEPO and a small enterprise to be the control tower for the power generators. It acquires the operating data of all power generators including the new & renewable power generation systems for remote, real-time monitoring such as environmental monitoring, performance monitoring, and early warning. It also has the functions for failure prediction, operation support, cause analysis, and quick recovery. More than 840 CCTV cameras installed in power plants monitor the facilities in real-time to allow the quick response during a fire or accident. The iPAS Universal system is easily accessible to the employees and applies the data processing acceleration technology to enable the quick data analysis. KOWEPO expects the system will contribute to the stable operation of generators and the improvement of power quality.



M&P(Monitoring & Prognostic) Center

Company-wide deployment of the mobile smart inspection system

KOWEPO is deploying the mobile smart inspection system of power generation sites throughout the company following the successful testing after its development. KOWEPO's Taean Thermal Power Complex Division developed the smart inspection system, which has the small inspection kits such as the thermal imaging camera and endoscopic camera mounted in mobile devices to inspect the power generation sites, and has been testing it since August last year. The test system had a wide range of functions such as TM (Trouble Memo) query and issuance, history query QR code, log sheet, and drawing query, and the new functions such as the work order and on-site issuance of red tag were added before the deployment company wide. The picture cloud function, in particular, greatly improved the power generator inspection capability by sharing the field inspection pictures immediately with the personnel in charge of the equipment. It changed the communication from the Bluetooth near-distance mode to LTE to improve the speed and eliminate the limitation of usage area. KOWEPO plans to continue adding the usable features and expand the application to solar power, wind farm, and other new and renewable energy sites and foreign sites.

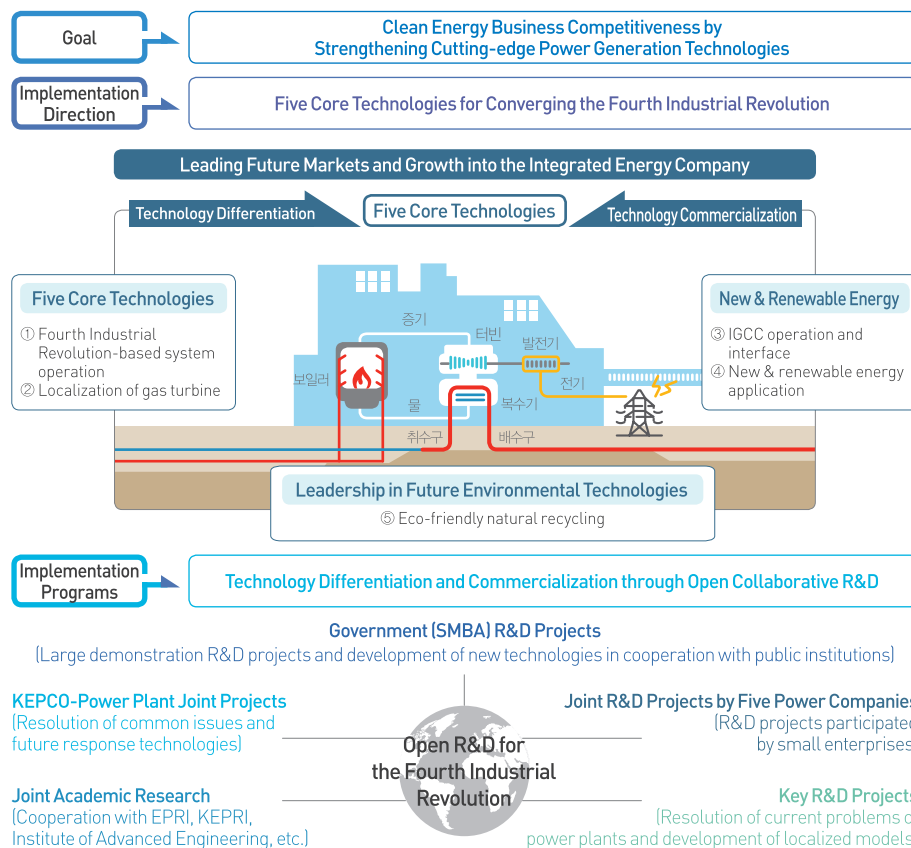
Building R&D Platform Centered on Customers

KOWEPO established the Mid- to Long-term R&D Roadmap to cope with the government's R&D policy direction, secure future technologies to lead the Fourth Industrial Revolution, solve the environmental problems such as fine dust, and actively respond to changes of the business environment.

Establishment of Mid- to Long-term R&D Roadmap

The Mid- to Long-term R&D Roadmap stipulates the stable income creation and expansion of future new growth business, which is the strategic direction of KOWEPO Vision 2030. It focuses on the increased investment in the development of five core technologies such as the system operation technology that converges the Fourth Industrial Revolution technology and power generation technology, localization of gas turbine, IGCC operation and interface, new & renewable energy application, and eco-friendly resource recycle technology and the commercialization of fundamental technologies secured through the empirical studies.

KOWEPO Mid- to Long-term R&D Roadmap

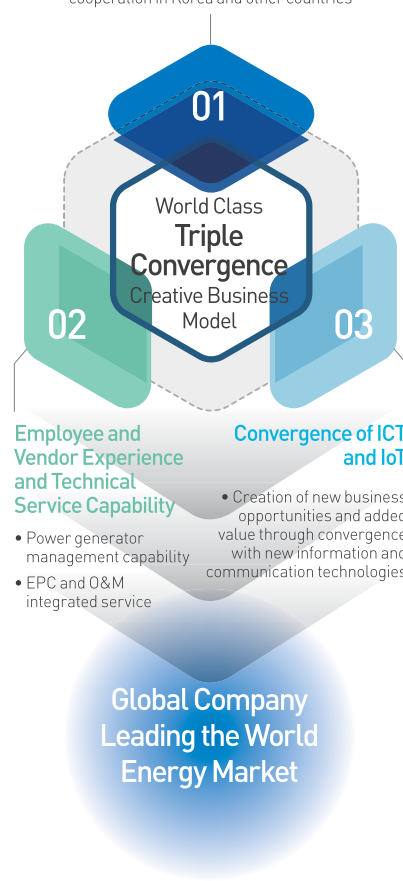


KOWEPO plans heavy investment in the development of cutting-edge technologies for the Fourth Industrial Revolution with the AI, robotics, and biotechnologies as the new growth engine. They include the big data-based AI machine, AR and VR technology, robot and drone technology to replace humans, and 3D printing to produce materials and parts any time and anywhere and the business models to commercialize the new power generation technologies.

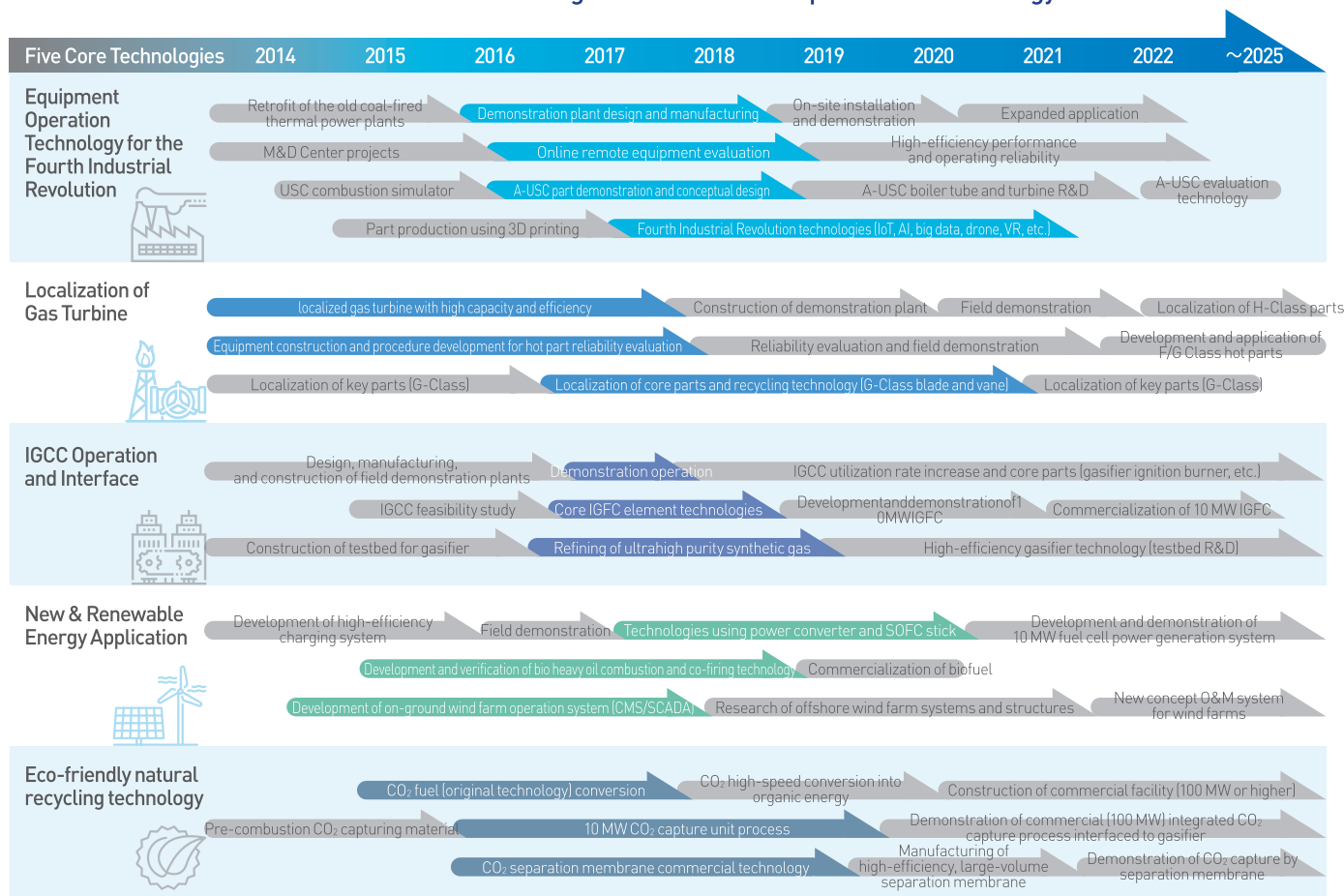
New Power Generation Business Model Converging the Fourth Industrial Revolution

Power Plant Operation Technology

- Long-term income creation
- Implementation of large projects through cooperation in Korea and other countries



Mid to Long-term R&D Roadmap for Each Technology



Five Core Technologies and Detailed Technologies (56)

I. Equipment Operation Technology for the Fourth Industrial Revolution

1. Integrated control system and advanced control technology
2. Optimal operation of supercritical distributed control system
3. Ultra supercritical combustion simulator
4. Power converter control
5. Ultra supercritical (A-USC) high-efficiency power generation system
6. Supercritical CO₂ power generation system
7. Water-zero power generation system
8. Power cable and connection box diagnosis and management
9. ICT-based integrated operation and maintenance
10. Smart plant (IoT, AOT, big data, etc.)
11. Power generation convergence (3D printing, robots, and drones)
12. USN-based convergence safety
13. Fuel assessment and application
14. Combustion and diagnosis analysis and optimization solution

15. Demonstration of life extension and performance improvement of standard coal-fired thermal power
16. Mechanical equipment diagnosis and monitoring
17. Electrical equipment diagnosis and monitoring
18. Performance diagnosis and efficiency management
19. Transformer aging deterioration evaluation and diagnosis

II. Localization of Gas Turbine

1. Development of high-efficiency and large-capacity gas turbine for power generation
2. Localization of gas turbine hot parts
3. Gas turbine monitoring and control
4. GT hot part management and maintenance
5. Part and material property and lifetime improvement
6. Lifetime assessment and maintenance optimization
7. Development of pure-oxygen gas turbine

8. Development of compressor blade coating technology
9. Development of compressor blade monitoring system
10. Gas turbine combustion tuning

III. IGCC operation and interface

1. Optimal operation of IGCC Korean model
2. Optimal operation of IGCC
3. Coal gasifier fuel cell (IGFC)
4. Utilization of gasifier testbed
5. Recycling of coal gasifier slag
6. Hybrid IGCC

IV. Application of new & renewable energy technology

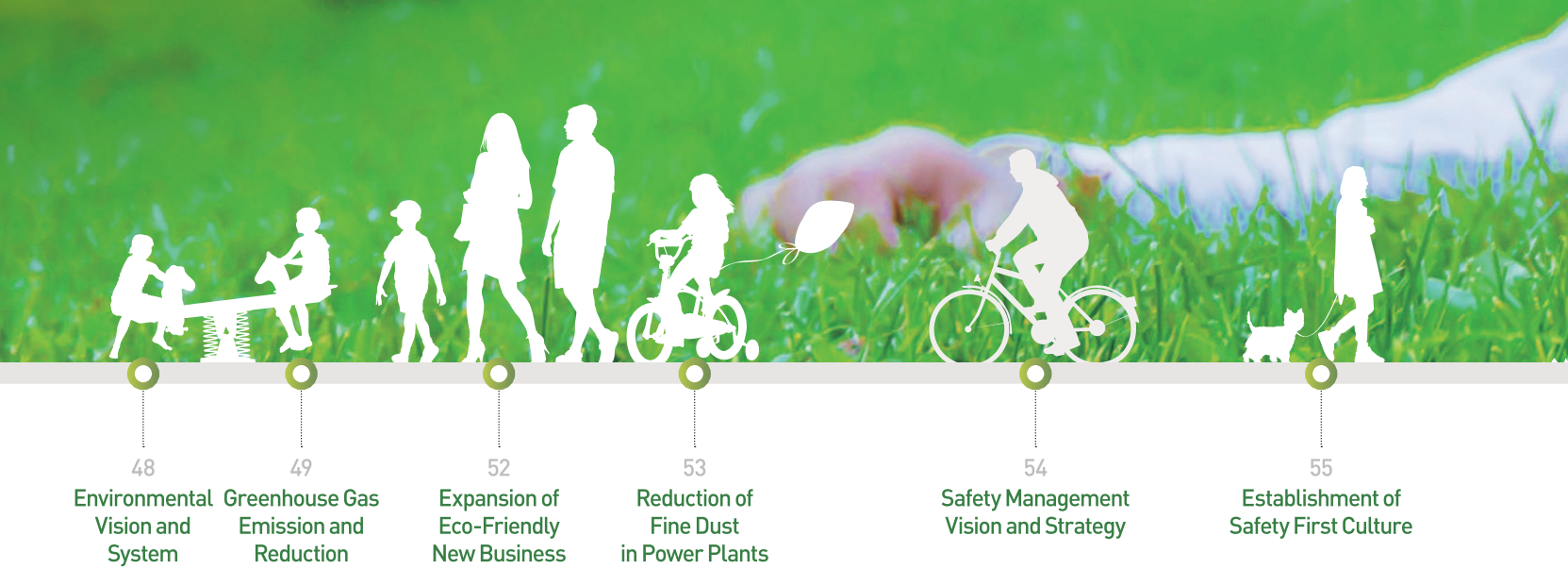
1. Operation of on-ground wind farm
2. Development and maintenance of the eco-friendly offshore wind farm
3. Development of biofuel
4. Biogas preprocessing enhancement
5. New & renewable fuel combustion and bioengineering
6. Solar power generation performance evaluation

7. MCFC application
8. High-efficiency SOFC application
9. Thermoelectric power generation
10. Seawater heat energy utilization
11. ESS linked with new & renewable energy

V. Eco-friendly natural recycling technology

1. Post-combustion dry CO₂ capture
2. Post-combustion wet CO₂ capture
3. Pre-combustion CO₂ capture
4. Post-combustion membrane separation CO₂ capture
5. CO₂ resource technology
6. Environment system optimization and advancement
7. Environmental impact evaluation and response
8. Recycling of power generation by-products
9. Boiler chemical washing and water treatment
10. Pioneering technology for responding to climate change

KOWEPO has established the aggressive greenhouse gas reduction target to cope with climate change and is applying new technologies and identifying the reduction projects to achieve the target. We are actively leading the fine dust reducing programs to assure healthy living environments for citizens also. KOWEPO is also preparing for the industrial safety and disaster control with the goal of becoming the global top class in safety by 2030.



Performance (As of the end of 2017)

Greenhouse Gas Reduction Rate

 **3.6%** (147tCO₂eq)

Fine Dust Emission

 **700** tons

Industrial Accident Rate

 **0.09%**



56

Smart Safety
Management System



57

Strengthening of
Safety Partnership



58

Disaster Safety



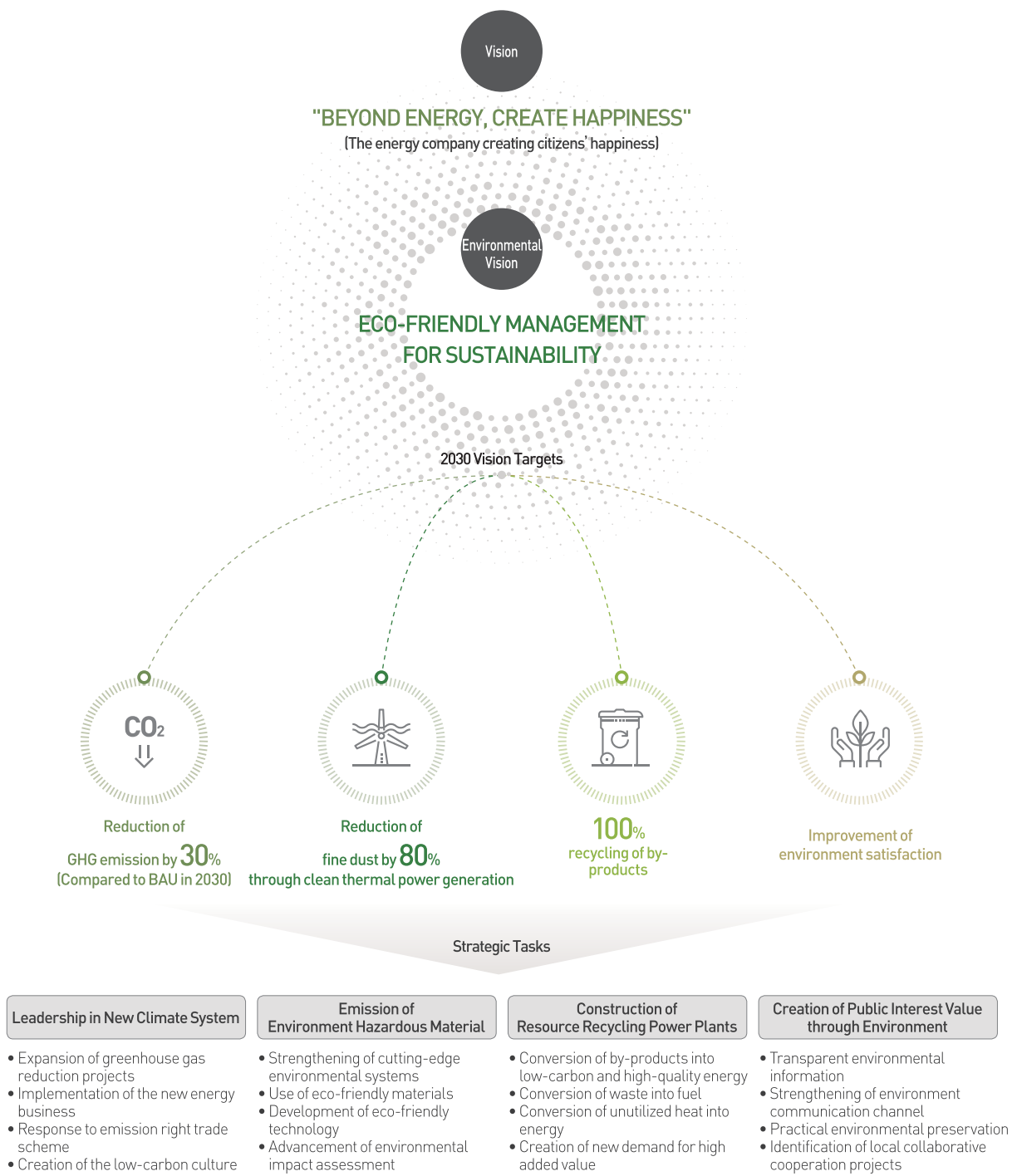
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Cyber Safety

Environment and Safety

Environmental Vision and System

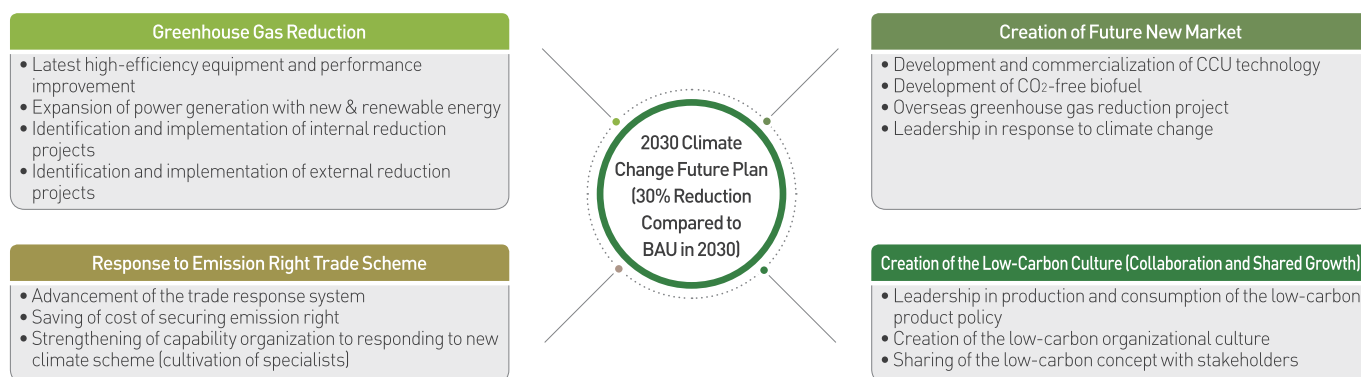
With the environmental vision of “Eco-Friendly Management for Sustainability,” KOWEPO has set the environmental satisfaction goals of 30% reduction of greenhouse gas compared to BAU (Business As Usual), 80% reduction of fine dust, 100% recycling of by-products, and improvement environment satisfaction. We established four strategic tasks and 16 implementation plans to achieve the targets.



Greenhouse Gas Emission and Reduction

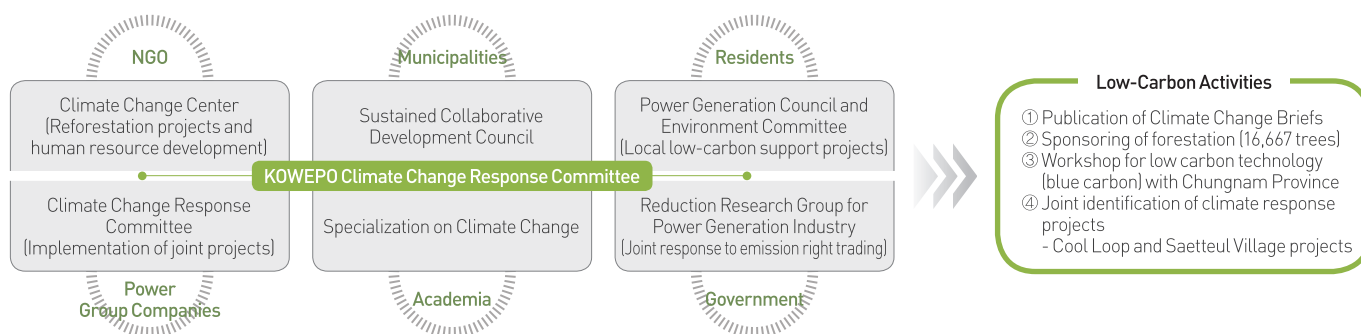
Establishment of the Low-Carbon Management System to Achieve the National Greenhouse Gas Reduction Roadmap

KOWEPO increased its greenhouse emission target from 23% to 30% compared by BAU in 2030 to reflect "Basic Roadmap Revision to Achieve 2030 National Greenhouse Gas Reduction Target" and is carrying out four implementation strategy to achieve the target.



Sharing of Various Low-Carbon Activities Utilizing the Climate Change Response Platform

KOWEPO continuously identifies the low-carbon action items through the collaboration with NGOs, municipalities, and residents with leadership by the Climate Change Response Committee.



Effort to reduce greenhouse gas

KOWEPO has established the annual reduction target to achieve the national greenhouse gas reduction target and is implementing the reduction activities such as the expansion of new & renewable energy, efficiency increase, and performance improvement in phases.

Subject	2016		2017		Remarks
	Target	Actual	Target	Actual	
Greenhouse gas reduction rate compared to expected emission (%)	2.5	3.2	3.6	3.6	Introduction of high-efficiency equipment, reduction of energy, expansion of new & renewable energy, etc.

Development of New Greenhouse Gas Reduction Technologies and Projects

Leading new technologies by developing CO₂ reduction technology CCUS*

KOWEPO is developing the wet capture CO₂ absorbent which reduces the energy consumption by 20% and maximizes durability and creating new energy industry by securing the mass production technology of microalgae feeding on CO₂ from coal-fired thermal power plants.

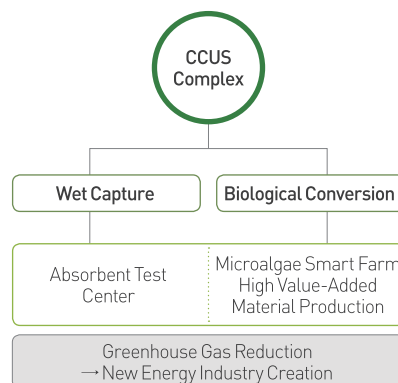
* CCUS: Carbon Capture Utilization & Storage



0.5 MW MAB Demonstration Facility

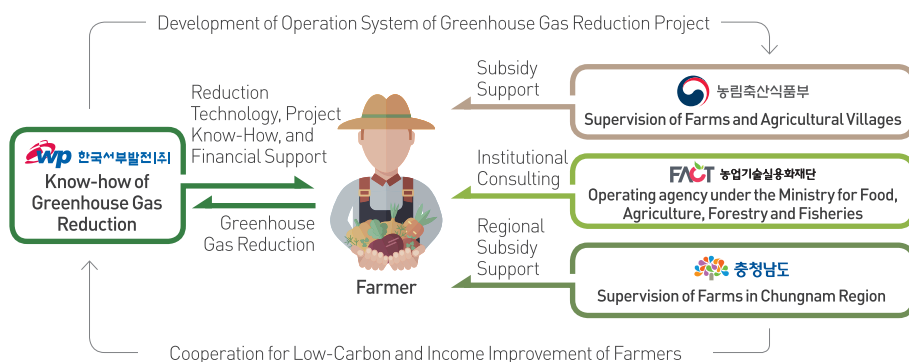


Microalgae Greenhouse, To Be Installed in Early 2019

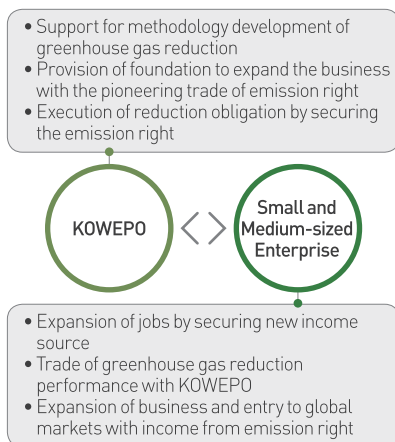


Farmer-Business Collaborative Greenhouse Gas Reduction Project

KOWEPO is carrying out the greenhouse gas reduction project jointly with the Ministry for Food, Agriculture, Forestry and Fisheries and Chungcheong Province to secure the external reduction for emission right trading through the collaborative cooperation with local farmers.



Subject	Number of Farmers	Technology	Greenhouse Gas Reduction (tCO ₂ /year)	Total Reduction during Project Period (tCO ₂)
Pilot Project	2	Geothermal heat pump, etc.	3,229	67,809
Projects for 2018	40	Multilayer insulating curtain, etc.	12,000(Expected)	180,000(Expected)



Reduction of Outside Greenhouse Gas Project with Small Enterprise for Job Creation

KOWEPO support the greenhouse gas projects (methodology development, outside business registration, etc.) by small enterprise with the goal of reducing greenhouse gas and creating new jobs. Moreover, we gather, select, and implement the programs to create income and jobs of small enterprises.

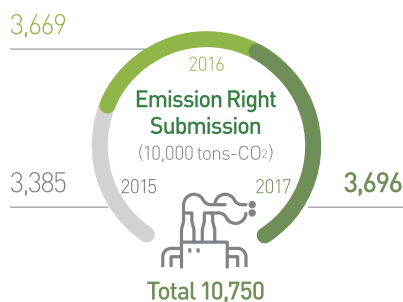
Carbon Footprint Certification

KOWEPO was the first Korean power company to receive the Carbon Labeling (renamed to Carbon Footprint) by completing the evaluation of whole greenhouse gas process related to power generation and power by-products. Taean Thermal Power Complex Division became the first Korean power plant to receive the Water Footprint certification related to power generation in October 2017. These certifications are the recognition of KOWEPO's contribution to the government policy to spread the eco-friendly and low-carbon culture.

Carbon Labeling Certification

Type		Carbon Emission from Power Generation (gCO ₂ e/kwh)				Carbon Emission from By-products (gCO ₂ e/kg)		
		Taeon	Pyeongtaek*	Seoincheon	Gunsan	Taeon refined ash	Taeon desulfurized	Taeon desulfurized gypsum
Certification amount	Pre-manufacturing	14.25	80.93	85.31	89.78	2.9	2.51	14.29
	During manufacturing	951.59	422.26	393.3	400.31	13.78	171.04	127.67
	Total amount	966	503	473	490	16.7	173.55	142
Certification validity		2018.6~2021.6		2017.12~2020.12		2017.12~2020.12	2016.6~2019.6	2017.12~2020.12

* Power generated in Pyeongtaek: Certified low-carbon products



First Planning Period of Emission Right Trade Scheme (2015~2017) Saving of purchase cost and fulfillment of obligation by diversifying trade methods

KOWEPO is operation the integrated greenhouse gas information system for accurate management of greenhouse gas emission and execution of efficient emission right trade. We saved the purchase cost of about KRW 3.1 billion through the long-term contract, swap, and diversification of greenhouse gas emission right during the first planning period and fulfilled the obligation for the period without penalty by conducting various greenhouse gas reduction programs.

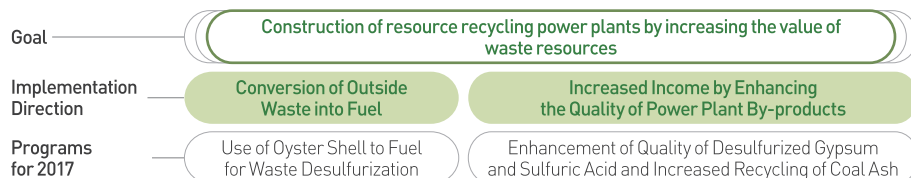
Leadership to Establish the Scheme by Pioneering Response to Climate Change

The climate change response policy that KOWEPO established through the identification vulnerable climate factors and workshops was selected as the outstanding case by the Ministry of Environment and distributed to other institutions in 2017 which was the first year of obligatory establishment of a policy to adapt to climate change by public institutions. We mitigated the climate risk by analyzing the impact and countermeasures of each factor such as the thunderstorm, severe heat, and drought and implemented social values through the measures to cope with drought in the Chungnam area and supporting the climate adaptation project in the vicinity of power plants.



Expansion of Eco-Friendly New Business

KOWEPO strives to promote the recycled economy that minimizes resource usage by constructing the resource recycling power plants through the enhancement of the value of waste resources.



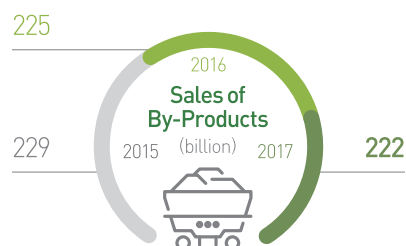
Creation of Social Value by Using Oyster Shell Waste as Desulfurization Fuel in Power Plants

Although the oyster shells are the good recycled resource to replace limestone, they have been disposed of in villages and shores to become the source of environmental pollution. As such, KOWEPO, Taeae-gun, local fishermen, and Gunsan National University cooperated to develop the technology to use the oyster shells as the fuel for desulfurization after reviewing their properties and relevant technologies. KOWEPO plans to install the system to handle about 60,000 tons of oyster shells in Tonyeong City which is the largest oyster-producing area in Korea. We expect the facility will increase fishery income, create jobs in small companies, and even create social values by solving the oyster shell waste problem.



Expanded Recycling of Power Plant By-Products

KOWEPO is creating sales income by improving the quality of desulfurized gypsum and sulfuric acid, which are the by-products of the power plant and recycling the coal ash. We are developing technologies and new businesses for continued expansion of recycling.



Technology Development Status

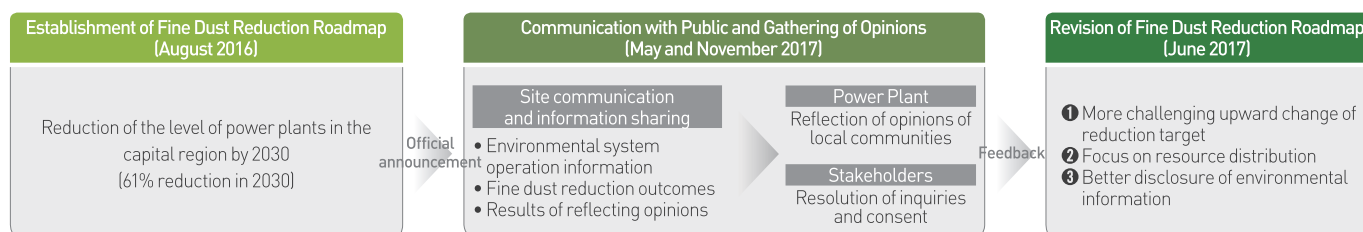
Collaborating Agency	Description	Development Period
Chungnam Province, F1 Tech, and KOWEPO	Development of asphalt filling using coal ash	August 2015-July 2017
Gunsan National University	Development of filling for excavation restoration using landfilled ash	August 2015-August 2018
HJ Enterprise and Hatbat National University	Development of building interior board from coal ash	May 2016-May 2017
KIGAM	Development of artificial basalt (building material, foundation, etc.) manufacturing technology using landfilled ash	July 2017-July 2918
Institute of Advanced Engineering	Development of geopolymers production technology using molten slag from a coal gasifier	June 2015-May 2018
Korea National University of Transportation	Development and commercialization of construction material (fine aggregate) using molten slag from a coal gasifier	September 2017-September 2019
Sambo Engineering	Development of mineral fiber manufacturing technology using brown gas	November 2016-February 2018

Reduction of Fine Dust in Power Plants

KOWEPO is transforming into an eco-friendly enterprise that answers the demand for reduced fine dust by citizens who want a safer living environment. It also changes its power plant operation paradigm to conform to the government's energy policy.

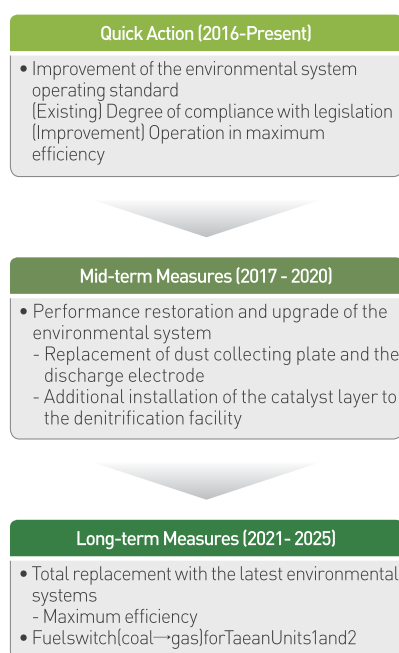
Establishment of Eco-friendly Power Plant Operation Roadmap through Open Communication

KOWEPO actively reflects the opinions gathered through continuous bidirectional communication with citizens in its power plant operation policy.



Setting of Aggressive Reduction Target that Reflects Communication Result

Type	Existing Fine Dust Reduction Roadmap (August 2016)				Revised Fine Dust Reduction Roadmap (June 2017)			
	2015 (Base Year)	2017	2025	2030	2015 (Base Year)	2017	2022	2025
Installed capacity (MW)	4,000	6,480	6,480	6,480	4,000	6,480	6,480	6,480
Reduction rate (%)	-	16	39	61	-	30	48	61
Discharge (Ton)	35,317	29,655	21,718	13,900	35,317	24,700	18,430	13,900



Establishment of Improvement Measures to Achieve Fine Dust Reduction Target

KOWEPO has established the three-step (Quick Action - Mid-term Measures - Long-term Measures) measures to achieve its aggressive fine dust reduction target and is implementing it.

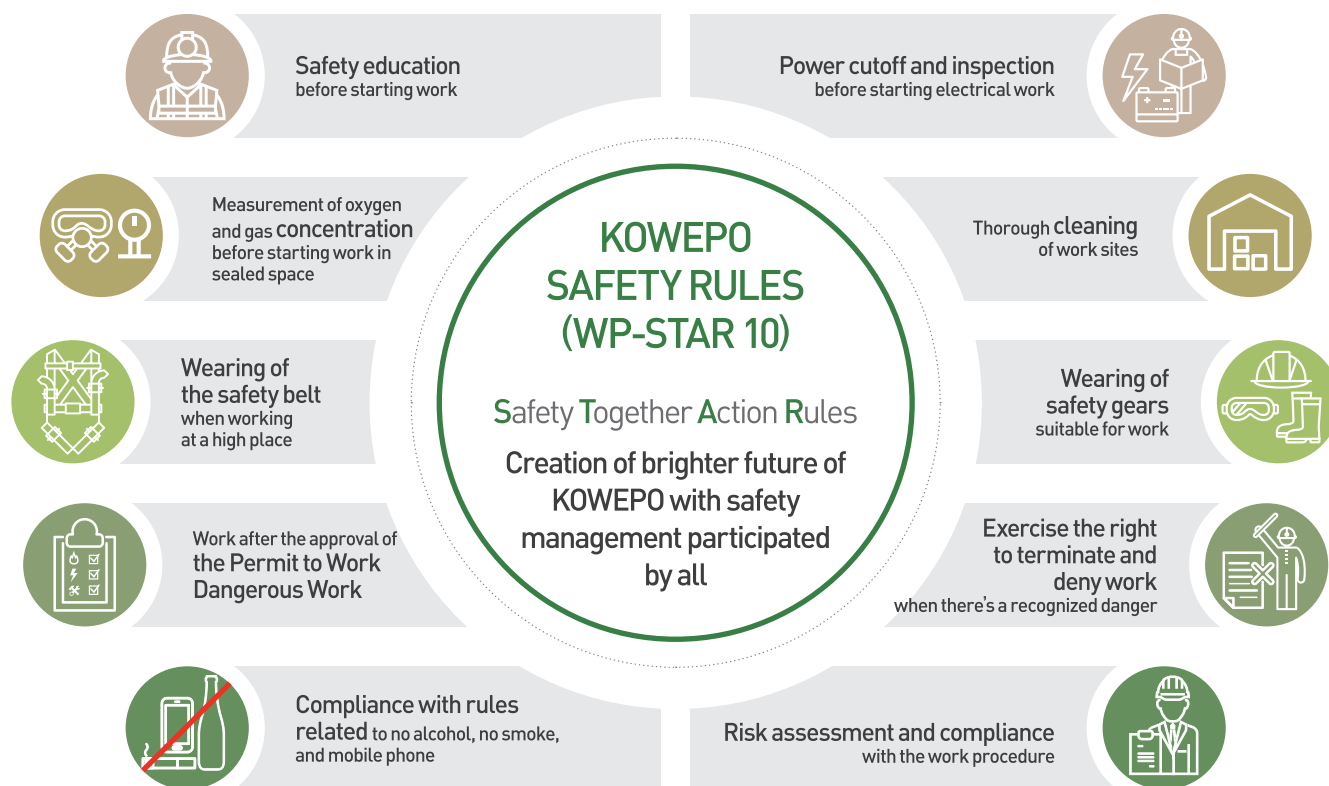
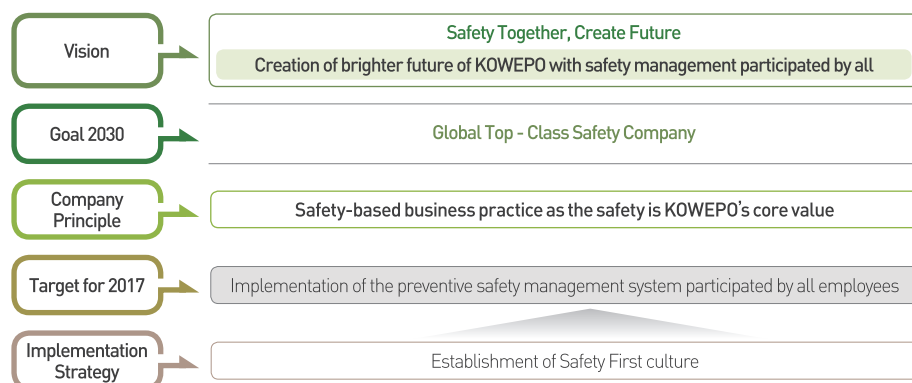
Introduction of New Technologies

KOWEPO intends to adopt the cyclone-type desulfurization technology to reduce SOx and fine dust level in the capital region. The cyclone-type desulfurization technology is the new SOx and fine dust reduction technology currently applied in power plants in China, and KOWEPO will establish a design suitable for the systems and operating conditions in Korea and apply it to all KOWEPO power plants after the verification by experts. KOWEPO applied the cyclone-type desulfurization technology in Taeon system in June 2017 and confirmed that the technology was effective for reducing SOx and fine dust.

Type	SOx (unit: (ppm)				Finedust(unit:mg/Sm ³)			
	Capital Region	2016	2017	Improvement rate	Capital Region	2016	2017	Improvement rate
Concentration	25.0	27.0	9.4	65.2%	5.0	7.8	3.6	53.8%
Removal efficiency (%)	-	90.0	98.7	8.8%	-	59.4	83.3	40.2%

Safety Management Vision and Strategy

KOWEPO selected the establishment of Safety First culture, Smart Safety management system, and strengthening of Safety Partnership as the implementation strategies to achieve safety management and successfully implement the preventive safety management system participated by all employees. KOWEPO intends to become a global top class safety company in 2030 by continuously practicing safety in all business operations.



Establishment of Safety First Culture

Expansion of Award Standard for Sites Achieving Zero Accident

KOWEPO is carrying out the zero-accident campaign jointly with the labor union to establish autonomous safety culture. The programs participated by all employees to prevent safety accident include the safety watchdog, Safety Day each month, and site inspection to identify potential risk factors. Moreover, KOWEPO has eased the standard for rewarding long-term target time achievement, and increased the rewards and training for employees as incentive for achieving zero-accident. Active adoption of outstanding cases identified through benchmarking also helped to maintain zero accident in all sites since 2015.



Safety Performance Mileage Scheme

KOWEPO is carrying out the safety performance mileage scheme to verify and reward safety outcomes such as the identification and correction of safety problems, sharing of secondary accident cases, and acquiring professional certification related to safety. As a result of encouraging employee participation through the safety performance mileage scheme, KOWEPO performed 1,954 cases of safety activities in 2017.

Declaration of WP STAR-10

KOWEPO proclaimed "KOWEPO 10 Essential Safety Rules (WP STAR-10)" established through the analysis of accident, gathering of employee opinions, and advice of outside experts. "STAR" in WP STAR-10 refers to "Safety Together Action Rules" with which all KOWEPO employees, vendors, and visitor must comply. KOWEPO was the first public institution to establish the practice-centered safety culture by spreading the essential safety rule enacted by active employee participation throughout all sites.



Expansion of Mandatory Checking of Dangerous Work

Severe accidents related to diving, excavation, and chemical handling are continuously occurring on work sites all over the world. KOWEPO is operating the autonomous inspection checklist for each dangerous work by categorizing all contracted works into nine dangerous works. Moreover, we conduct the joint inspection of 41 potential risk factors by vendors, supervising, and safety departments to build a workplace that is free from risk.

Number	Work Item	Risk Factor	Inspection
1	Work at high place	Falling	Safety belt, life line, and net to prevent falling
2	Sealed space	Suffocating	Measurement of oxygen concentration and installation of the ventilation fan
3	Use of fire	Fire and explosion	Removal of flammable material, installation of fire extinguisher, and assignment of a supervisor
4	Heavy object	Strangulation	Assignment of signaler and installation of work section
5	Electrical charging (cutoff)	Electric shock/burn	Grounding and wearing of safety gears such as insulation gloves
6	Use of radioactivity	Exposure	Access restriction and wearing of radiation safety equipment
7	Diving	Strangulation	Communication, diving equipment, and checking of diver health
8	Excavation (30 cm or more)	collusion and collapse	Review of drawing, marking of work area, and checking of equipment
9	Chemical substance	Suffocation and explosion	Ventilation and wearing of safety gear

Integrated Safety Management System Applying ICT (Information and Communications Technologies)

Taeon IGCC (Integrated Gasification Combined Cycle) is the industry's first chemical plant-based power generation system and thus is vulnerable to severe industrial accidents. KOWEPO must consider that employee and equipment security is the top priority. To this end, KOWEPO has implemented the integrated safety management system converged with the cutting-edge ICT. It will be converged with the latest technologies such as IoT, VR, and AR and distributed to all sites.

Big Data-Based Safety Accident Statistical System

KOWEPO operates the accident statistical analysis system that identifies the accident types by period and category by analyzing the data of accidents that have occurred on its sites and used them for safety management. The results of the disaster type analysis showed that the falling accounted for the majority (72%) of the accidents, and thus KOWEPO has strengthened the procedure for working at high place and established the standards for safety inspection of structures, wearing of safety belt, installation of safety net, and installing double safety lines.

Certification of Safety and Health Management System at Head Office and All Business Sites

KOWEPO acquired the certification of the safety and health management system at its head office and all regional sites to reflect the policy of top management, prioritizing company safety and health system and managing all safety and health management activities systematically and autonomously. The certification process recognized the excellence of compliance with the requirements of the international safety and health management system and the safety and health regulation, faithful execution of the safety and health management system, and continuous identification and improvement of risk factors.

Real-time Safety Monitoring Using Smart Device

Integrated Safety Management System

- Sending of warning message for a dangerous situation
- Sending of worker position and physical/emotional state

Personalized Safety Management System

- Approval of people in and out of dangerous areas
- Company-wide real-time sharing of dangerous work situation

IGCC Process Area Access Management System

- Building of DB of work details and harmful substance information
- Real-time monitoring of the risk level of each site, department, and process

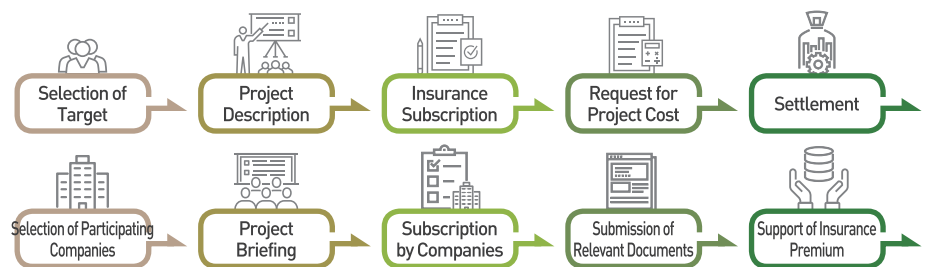
Long-term Measures (2021- 2025)

Strengthening of Safety Partnership

Support for Vendors to Subscribe to the Disaster Liability Insurance

KOWEPO provides the support for its vendors to the subscribe the employee disaster liability insurance to create a workplace free from the danger of industrial disaster and conforming to the government's policy for shared growth. KOWEPO supports up to 75% (maximum of KRW 5 million per company) of insurance subscription cost at the time of the accident to reduce the industrial disaster rate and management risk of small companies by providing the financial support for the victims and easing the burden of small companies.

Project Implementation Procedure



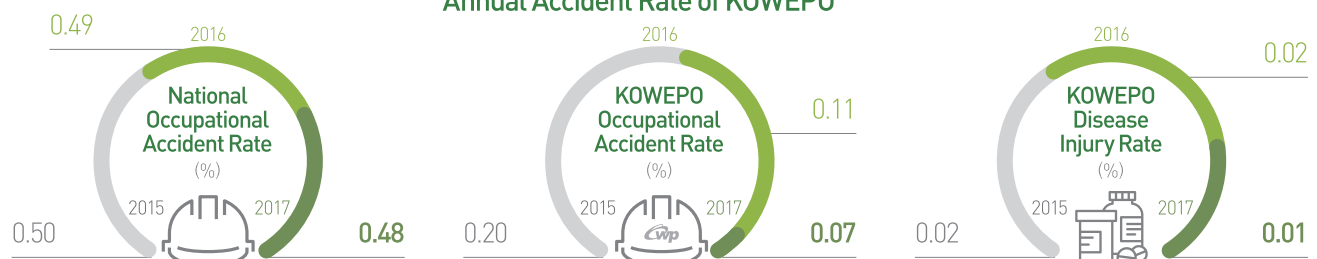
Support of Safety and Health Management System for Maintenance Vendors

KOWEPO created the mandatory certification scheme of safety and health management system for the vendors to achieve zero-accident and sustained growth. It also supports up to KRW 3 million to reduce the burden of acquiring the certificate. Nine small vendors in 2016 and five in 2017 received the safety and health management system certification through the support scheme and secured the safety management competitiveness. KOWEPO plans to strengthen the safety partnership to continue supporting the vendors in creating a safe workplace.

Strengthening Standards for Appropriation of Occupational Health and Safety Management Cost for Projects

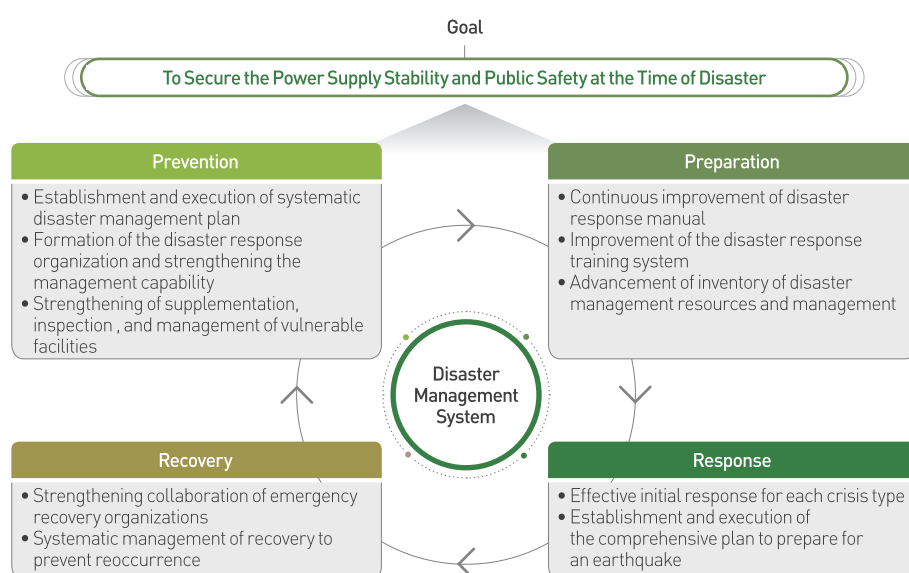
According to the occupational health and safety management cost guidelines by the Ministry of Employment and Labor, KOWEPO can pay the occupational health and safety management cost for the order in the amount of KRW 40 million or more, when it is difficult to secure the safety budget for small projects. KOWEPO has established its own standard to support the safety cost and pay 100% of design safety cost for small projects to solve the difficulties. KOWEPO additionally paid KRW 780 million of safety cost in 2017 for the program to create the virtuous cycle for prevention of safety accident through the increased investment in safety facilities.

Annual Accident Rate of KOWEPO



Systematic Disaster Management Activities

KOWEPO carries out the systematic disaster management activities for each step of Prevention, Preparation, Response, and Recovery with the goal “To secure the power supply stability and public safety at the time of disaster” and has the capability to quick and effective preemptive response and recovery.



Establishment and Execution of Disaster Management Plan to Comply with the Government Policy

Type	Basis	Description
Detailed Execution Plan for National Safety Management	Framework Act on the Management of Disasters and Safety	<ul style="list-style-type: none"> Establishment of control tower by building the integrated platform for disaster management center Optimal response to accidents by strengthening the capability to respond to the earthquake and fire
National Infrastructure Protection Plan		<ul style="list-style-type: none"> Establishment of protection target and subject for the national infrastructure facilities Strengthening preparation by establishing the risk resolution and prevention measures

Improvement of Disaster Response Manual

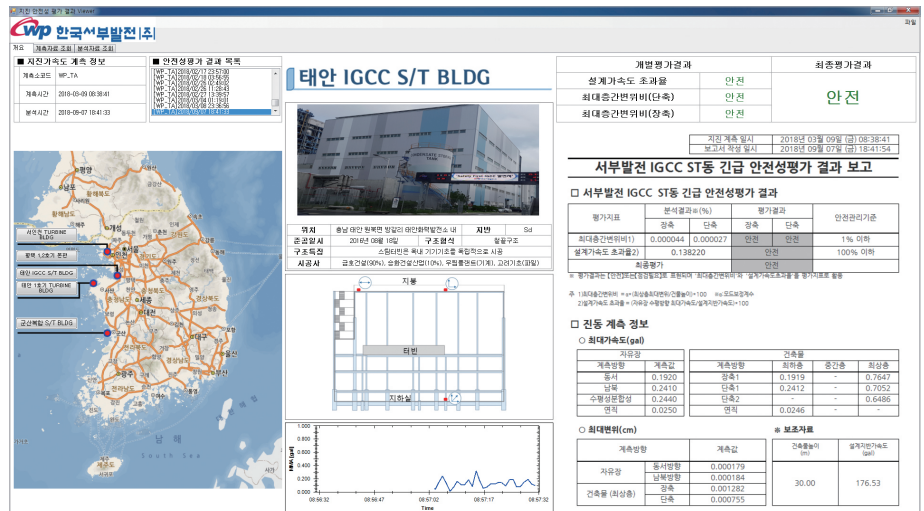
Type	Improvement
Emergency alert standard	<ul style="list-style-type: none"> Clarification of standard for issuing the Attention-Caution-Warning-Severe alerts
Linking with crisis alarm	<ul style="list-style-type: none"> Linking and matching the KOWEPO emergency alarm and national crisis alarm (Attention-Caution-Warning-Severe)
Situation evaluation meeting	<ul style="list-style-type: none"> Seeking of quick response and minimized damage by establishing the operating guidelines of situation evaluation meeting
Manual management	<ul style="list-style-type: none"> Assignment of manual management number, operation of the designated storage box, and designation of managing department and supervising department for each disaster type

Strengthening of Disaster Response Training System Participated by All Employees

KOWEPO has developed the training system for initial response, situation management, and comprehensive execution to resolve the problems related to the difference in disaster response training by sites and to improve the participation. It also established the periodic training system participated by all employees and strengthened the disaster response training system.

Development of Software for “Evaluation of Emergency Safety of Power Plant Structures” at the Time of Earthquake

KOWEPO implemented the industry's first optimal earthquake response system that facilitates multi-dimensional response to an earthquake in October 2017. This system uses the safety evaluation indices such as the design ground acceleration exceeding rate, maximum displacement on the highest floor, and natural frequency change rate taking into account the specificity of individual building in power plants. It links the design data and actual measurement results to improve the accuracy of the evaluation and immediately present the need for inspection at the time of earthquake. Moreover, KOWEPO clarifies the power plant operating limit by analyzing the correlation between earthquake and automatic turbine shutdown to assure the prevention of equipment damage and the business continuity.



The large training programs jointly conducted by civic organizations

Strengthening of Collaboration through the Training for Disaster Response Jointly with Relevant Agencies

KOWEPO managed and participated in a total of seven joint training programs with relevant agencies in 2017. The large training programs jointly conducted by many agencies and civic organizations verify the effectiveness of the manual procedure and strengthen the capability to respond to disasters through collaboration.



Received the Highest Rating in 2018 Safety Korea Training for Disaster Management

Received the Highest Rating in 2018 Safety Korea Training for Disaster Management

KOWEPO was selected as the highest rated agency in 2018 Safety Korea Training for Disaster Management conducted in May 2018. This training was the integrated training participated by more than 140 people from the central government and the agencies in the private and public sectors with the theme of “Power Facility Fire/Explosion and Scattering of Foreign Substances” established by the Gunsan Combined Cycle Power Division for the new type of composite disaster. KOWEPO was rated as having conducted the field training in an organic and vigorous manner based on the characteristics of the power plant and the experience of past disasters.

Establishment of Cybersecurity Implementation System

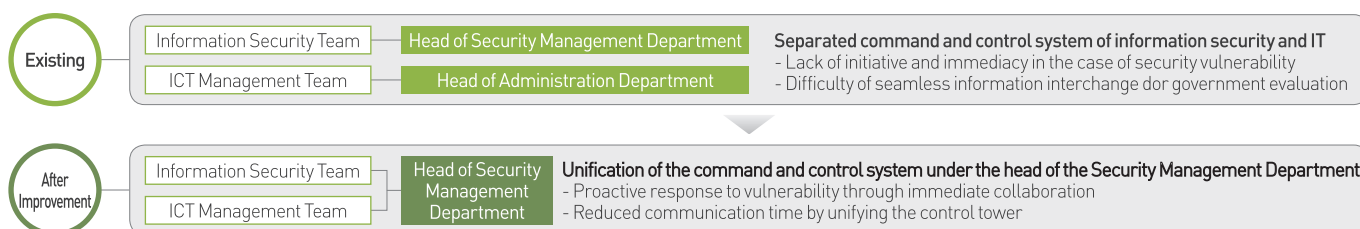
Complete Level of Information Security

KOWEPO established the defense against intelligent cyber hacking, enhancement of information security management system to strengthen personal information management, and the establishment of control security management system as three implementation strategies and identified nine focused implementation tasks.

Improvement of Organization and Inspection System

Unified control tower operation

KOWEPO unified the command system of the Information Security Team and ICT Management Team under the Head of the Security Management Department to act as the control tower to strengthen the cybersecurity activities.



In-house Monitoring

KOWEPO is actively carrying out constant monitoring of cybersecurity through the cooperation between the Security Management Department at the head office and the IT Security Team in power complexes.

Focused Management of Vulnerabilities

Management Status and Vulnerability Analysis

KOWEPO has selected the most difficult items that require focused management under a single command system to identify the causes of vulnerability and fundamental solutions to strengthen cybersecurity.

Achievement of the Highest Level of Cybersecurity

In recognition of its efforts to strengthen cybersecurity, KOWEPO received 93.7 points in information security and 94.4 points in infrastructure protection for the overall score of 93.84 and ranked no. 1 among 35 public institutions in the evaluation by the National Intelligence Service in 2017.

Implementation of 3-Step Vulnerability Management System for Complete Prevention of Cyber Intrusion Threat

Step	Time	Person in Charge	Management	Detailed Measures
Step 1	Implementation	IT manager	Individual inspection	First inspection, and improvement by each person in charge
Step 2	Quarterly	Each department	Total inspection	Total inspection with focus on 238 vulnerable parts
Step 3	Quarterly	IT Field coordinator	Complete improvement	Notification of results, and confirmation of measures

Enhancement of Information Security Management System

- Focused and constant management of vulnerabilities
- Focused improvement of system vulnerabilities
- Strengthening the comprehensive management system

Establishment of Privacy Policy

- Improvement of personal information management system
- Strengthening information protection measures
- Prevention of information intrusion

Establishment of Control Security Management System

- Strengthening advance inspection of control systems
- Security verification of new equipment
- Strengthening practical training against cyber attacks

In-house Monitoring

Information security audit (once a year) and protection level diagnosis (four times a year)

Information Security Management System

Personal information upgrade (four times a year) and inspection by the third party (twice a year)

Privacy Policy

Vulnerability analysis (once a year) and response training (once every six months)

Control Security Management System

Linking of Security Diagnosis Items with Internal Evaluation and Upward Adjustment of Target Level

KOWEPO selected 110 manageable items related to cybersecurity and adjusted the target upward to 100 points. It conducts the diagnosis every quarter and reflects the result of the internal evaluation to improve the security management level.

Assignment of Experts and Systemization for Focused and Constant Management of Security Vulnerabilities

KOWEPO assigned an expert with 10-year experience for the management of cybersecurity vulnerabilities year round. The current status of information assets and final checking of the assets by the specialized staff before the acceptance inspection ensures thorough management.

Protection of Infrastructure Facility

Strengthening Inspection of Control Systems

KOWEPO operates the task force team to identify and improve the power generation control systems. It also applies the physical and technical protective measures such as port sealing to block unauthorized access to the control system.

Strengthening Security Education and Training

KOWEPO seeks to consult for advance identification of security risks and apply the countermeasures to operate the new equipment stable and improves the security level through the ICT infrastructure vulnerability analysis and diagnosis by the Ministry of Commerce, Industry, and Energy. KOWEPO conducted ten training programs against cyber attack and the education on 23 curriculums for security in 2017.

Priority Protection of Personal Information

Systematic and Preemptive Planning

Inspection and Improvement of Lifecycle-Based Protection System

KOWEPO is improving the protection system for each lifecycle to protect personal information and continuously receives the site inspection and consulting to strengthen the information management function of the personal information processing systems.

Strengthening of Privacy Protection

KOWEPO prevents the leakage of personal information through the preliminary risk analysis of five processing systems including server and network, the double protection of the personal information on PC, and the addition of DRM password for electronic documents.

Education customized for each role

KOWEPO is enhancing the privacy protection capability through the education customized for each role. As a result, KOWEPO received the highest rating in privacy protection level assessment by the Ministry of Public Administration and Security for three years in a row.

KOWEPO launched “WP Social Value Fulfillment Committee” to lead fulfilling social values and is actively developing business models and supporting welfare benefits to create jobs and carry out collaborative cooperation programs with local communities. We also strive to protect the human rights of stakeholders.



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Development of
Business Model
for Local Collaboration



65

Job Creation



68

Human Rights

Performance (As of the end of 2017)

Hiring of New Employees



198

Voluntary Service Time of Employees



35,727 hours

Purchase of Products
from Social Economic Enterprises



KRW **8.47**
billion



72

Welfare Benefits
for Local Community

Leading the Implementation of Social Values

Development of Business Model for Local Collaboration

Use of Warm Drain Water from Power Plants

Use of Warm Drain Water from Power Plants

Realizing that the warm drain water used to cool the outer boiler wall at the power plants is about 7 °C higher than surrounding water, KOWEPO uses it for smart farm and fish farm projects to contribute to the income increase of local farmers and fishermen. The smart farm project (construction of the greenhouse to be completed in December 2018) will be Korea's first leading country-level smart farm demonstration complex and expected to create 55 new jobs and income of KRW 11.9 billion to 24 villages in Weonbuk-myeon in Taeon in five years. Moreover, it is carrying out the high-efficiency fish farm using the warm water heat source and the cutting-edge fish farm technology jointly with the operating council participated by local fishermen. We expect the increases income of KRW 800 million for fishermen and ten new jobs when the fish farm opens for business.



Signing of Agreement for Constructing Horticulture Complex Using Warm Drain Water from Taeon Thermal Power Plant

New project to support sustainable sales channel specialized for Taeon which is known as the City of Flower - WP Social Flower

The number of floriculture farmers in Taeon-gun decreased from more than 390 in 2005 to about 190 in 2017, and they are selling their flows at bargain through auctions as there are no direct sales channels. KOWEPO has been collaborating with Taeon-gun, Taeon Floriculture Association, floriculture startup ventures, and floriculture farmers to identify the ways to develop new sales channels since 2017 and has been carrying out "WP Social Flower" project since May 2018. KOWEPO has been collaborating with Taeon-gun, Taeon Floriculture Association, floriculture startup ventures, and floriculture farmers to identify the ways to develop new sales channels since 2017 and has been carrying out "WP Social Flower" project since May 2018. We developed the online sales channel platform called "Farm to Table @Taeon (Honest Flower)" in May 2018 and plan to carry out the marketing campaign beginning in September. The "WP Social Flower" project uses the floriculture production process for storytelling and has adopted the direct sales from the farm (farmers) to customers (table) for continuous creation of high added value. We purchase the flowers from the floriculture farmers and donate them to the welfare facilities in Taeon to be used for horticulture treatment (Flower Healing) of the neglected elderly people. KOWEPO expects the project will lead to "Killing four birds with one stone" effect with the benefits of increased farmer income (KRW 250 million/year), job creation (8 people/year), emotional support for the elderly (150 people/year), and cultivation of startup venture.

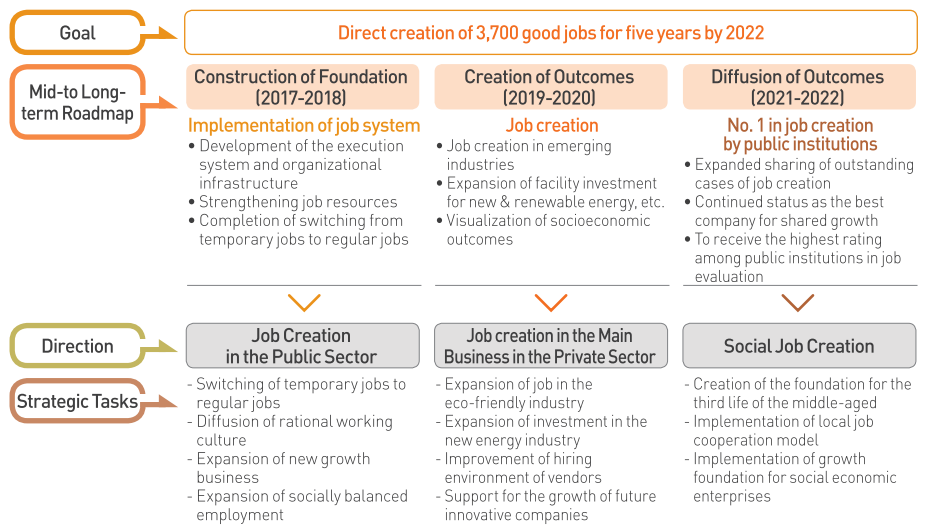


Farmer-Business Collaborative Greenhouse Gas Reduction Project

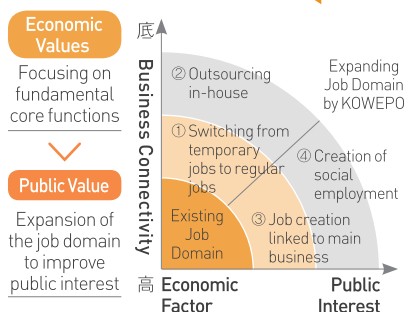
KOWEPO signed the "Agreement to Create Jobs through Innovative Farmer-Business Collaborative Greenhouse Gas Reduction Project" with the Foundation of Agri. Tech. Commercialization & Transfer (FACT) in April 2018. Both parties have been carrying out the business-farmer collaborative greenhouse gas reduction project since 2016. KOWEPO provides the low-carbon facilities (geothermal, multi-layer insulated curtain, biogas plant, etc.) to reduce greenhouse gas to the farmers jointly with the government and municipalities, and the enterprises use the emission right secured through the reduced greenhouse gas. As the project that began with two farmers in 2016, expanded to 43 in 2017, and is expected to expand to more than 200 in 2021, KOWEPO plans to train local college students, retirees, and returned farmers to be the project professionals and assign them to the field. The business-farmer collaborative greenhouse gas reduction project that KOWEPO initiated for the first time Korea is spreading to other organizations. It has contributed to human resource development and job creation for the young and old people of the region.

KOWEPO strives to execute all projects from the job creation aspect to be in step with the national policy that has job creation in highest priority and plays the pioneering role as the role model in job creation for public institutions by faithfully carrying out the fundamental duty to fulfill social values. Moreover, we gather ideas for job creation through contests and try to provide support for the neglected group by identifying new projects for job. In recognition of its efforts, KOWEPO was named as the best organization for job creation in the private sector in the Public Institution Job Contest jointly held by the Presidential Committee on Jobs and the Ministry of Strategy and Finance. It also received the Presidential Award after it was selected as one of the top 100 Korean companies in job creation which was equivalent to the medal for outstanding job-creating companies.

Mid-to Long-term Roadmap for Job Creation



Expansion of Job Creation Paradigm



Type	2015	2016	2017
Quota (A)	2,166	2,296	2,426
Current status (B)	2,077	2,177	2,352
Difference (A-B)	89	119	74
Temporary leave of absence	83	76	79

Establishment of Three Strategic Direction through Expansion of Paradigm for Main Business-Linked Job Creation

KOWEPO expanded the job creation paradigm for the creation of good jobs to the employment domain for increased public interest. We are carrying out a company-wide effort for creating good jobs by selecting the job creation in the public sector, job creation in the main business of the private sector, and social job creation as three strategic directions for job creation and then 23 focused implementation projects and in 11 strategic tasks according to the strategic direction.

Job Creation in the Public Sector

Employment Expansion

KOWEPO hired 198 new employees in 2017 by hiring the maximum number of employees within the scope of the Guidelines on Public Institution Organization and Quota Management to comply with the employment policy based on increased job availability through identification of new business and adoption of wage peak scheme.



Switching from temporary jobs to regular jobs

KOWEPO is switching the temporary employees who perform the continuous tasks into to regular employees at KOWEPO or its subsidiary. The Regular Job Conversion Deliberation Committee and Management/Labor/Expert Council verified the procedural justification of the policy. Moreover, we apply the optimal conversion for each job type with consideration to the characteristics of the task to ensure fair switching by improving the status of switched employees and eliminating discrimination.

Sharing of Jobs

KOWEPO plans to hire 100 new employees in three years by improving the unneeded job practice, reducing overtime, and promoting the use of vacation.

Overtime Work by Employees

Type	Vacation Compensation and Overtime Compensation			Type	Overtime Work Statistics per Person		
	2015	2016	2017		2015	2016	2017
Current employees	2,077	2,177	2,352				
Vacation compensation	KRW 2.3 billion	KRW 2.6 billion	KRW 2.0 billion	Overtime compensation	KRW 4.19 million	KRW 3.9 million	KRW 2.89 million
Overtime compensation	KRW 8.7 billion	KRW 8.5 billion	KRW 6.8 billion				
Total labor cost	KRW 151.0 billion	KRW 153.8 billion	KRW 159.7 billion	Overtime work hours	118.4h	103.9h	78.5h

Creation of Private-Sector Jobs Linked to Main Business

KOWEPO created 251 private-sector jobs linked to the main business in 2017 and plans to create 218 in 2018.

Large Investment in Eco-friendly Industry

In response to the public's interest in the emission of fine dust from thermal power plants due to worsening atmospheric environment, KOWEPO has contributed to the creation of jobs in the eco-friendly industry by investing heavily in eco-friendly facilities such as desulfurization and dust collecting facilities to reduce fine dust.

Investment in New Energy Business to Secure Future Growth Engine

KOWEPO contribute significantly to the creation of jobs in construction by investing heavily in combined cycle power plants and new & renewable power plants to conform to the accelerated paradigm shift centered on eco-friendly and safe energy and to secure the future growth engine.

Shared Growth with Vendors through Establishment of Job-Friendly Ecosystem

KOWEPO contributed to job stabilization of small and medium enterprises by supporting the quick settlement of payment through the collaborative payment system for the relatively small second and third-tiered vendors. Moreover, we lead the effort to create the industrial ecosystem in which the job-friendly small companies improving the procurement scheme to reflect the extra credit for the employment period are respected.

Support for the Growth of Future Innovative Companies to Be Ready for the Fourth Industrial Revolution

KOWEPO leads the creation of future jobs by executing the mid- to long-term ICT master plan to construct the smart power plant and making a large investment in R&D to secure the future core technologies. Moreover, we are actively creating the innovative jobs also through technical business startup such as in-house venture.

Expansion of Job Creation Paradigm



Social Job Creation

KOWEPO created 44 social jobs in 2017 and plans to create 53 in 2018.

Creations of Jobs for Senior People - "60-Year Old New Employee"

The Taean region urgently needs the measures of senior people as 27% of the total population is 65 years or older and 28% of the elderly live alone. KOWEPO has established a systematic process with the local residents and collaborating agencies to perform rational support measures to create jobs for the elderly.

	Project Description	Outcomes in 2017
Senior Happy Dream	<ul style="list-style-type: none"> Education on pet food production and cooking Aquaculture fee production management 	<ul style="list-style-type: none"> Senior Happy Dream with support from the local aquaculture enterprise Senior Happy Dream and Participatory Happy Dream which is sponsored by the Ministry of Welfare and supported by the elderly-friendly companies KRW 300 million each by KOWEPO and the Ministry of Welfare for the elderly-friendly projects
Cohabitation with Senior People	<ul style="list-style-type: none"> Jobs such as culture management and elderly caretaker that are suitable for the senior people 	<ul style="list-style-type: none"> Agreement signed with the Korea Labor Force Development Institute for the Aged to find the projects to find jobs for the aged Support of KRW 300 million from Agricultural and Fishery Collaboration Fund for the locally active senior clubs

Support for employment of local human resources: "One-Stop Experiential Internship Program"

KOWEPO analyzed the results of the internship program for 2016 and launched the "One-Stop Experiential Internship Program" in 2017 to enhance the employment competitiveness of local human talents. The program for 2017 selected 70 interns five universities (Gongju National University, Korea University of Technology and Education, Dankook University, Seonam University, and Korea Nazarene University) and diversified the operation period to short term (two months) and long term (four months). Moreover, we expanded the power company experience to the whole company, upgraded the introductory education on power generation from two weeks to four weeks, and created the employment capability strengthening education that included the exercise on generating the application and the interview and the special lecture by the NCS specializing agency.

	Operation in 2016	Survey Result	Improvement Direction
Number of personnel	<ul style="list-style-type: none"> 19 people (two universities) 	<ul style="list-style-type: none"> Limited selection 	<ul style="list-style-type: none"> Expansion of participants and schools
Operation Period	<ul style="list-style-type: none"> One month 	<ul style="list-style-type: none"> Operation period too short for the program 	<ul style="list-style-type: none"> Extension of the operation period
Program Details	<ul style="list-style-type: none"> Work experience (1-2 weeks) - Taean Thermal Power Complex Division (steam) Introductory education of power generation (3-4 weeks) 	<ul style="list-style-type: none"> Simple work experience program - Limited experience and short period Education on application process such as interview needed 	<ul style="list-style-type: none"> Improvement of work experience program Creation of the program that can actually help preparation for each hiring type

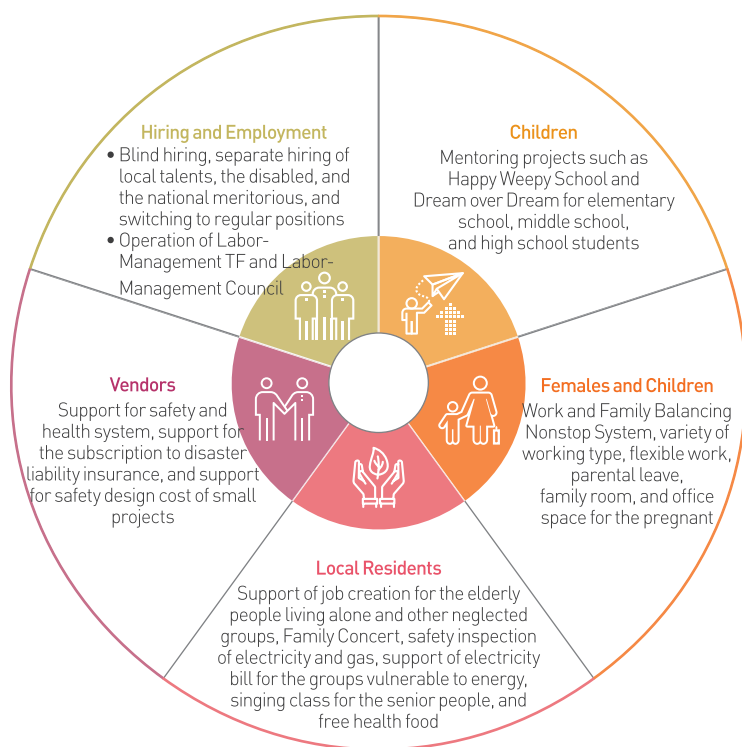


Expansion of employment opportunity for the vulnerable group: High school graduates, national meritorious, females in career break, disabled.

KOWEPO is expanding the employment opportunities of the vulnerable groups such as the high school graduates (24 people), national meritorious (19 people), and disabled (4 people) through a separate process. We also allocate extra points to the females in career break, local talents, national meritorious, and the disabled to enhance their competitiveness.

Since the UN announcement of UNGP (UN Guiding Principles on Business & Human Rights) in 2011, business and human rights have been the key agenda throughout the world. The enterprises began publishing the human rights reports after the UN disclosed the UN Human Rights Reporting Framework in 2015.

KOWEPO recognizes the human right management as the comprehensive concept that reflects sustainable management also. With the human rights management, we strive to increase the rights of stakeholders such as the customers, vendors, and local communities and applies the human rights legislation and the global standard for human right to become a leading human rights management company.



Overview of Human Rights Management

Definition of Human Rights Management

For KOWEPO, the term "Human Rights" refer to the rights guaranteed by the constitution and legislation, the rights recognized by various human rights standards and declaration, and the rights presented by National Human Rights Commission in Human Rights Management Guidelines. They mean the rights of dignity, value, and freedom as human beings that should be respected even if they are not specified explicitly. The term "Human Rights Management" refers to the management that respects human rights and puts humans first in all management activities.

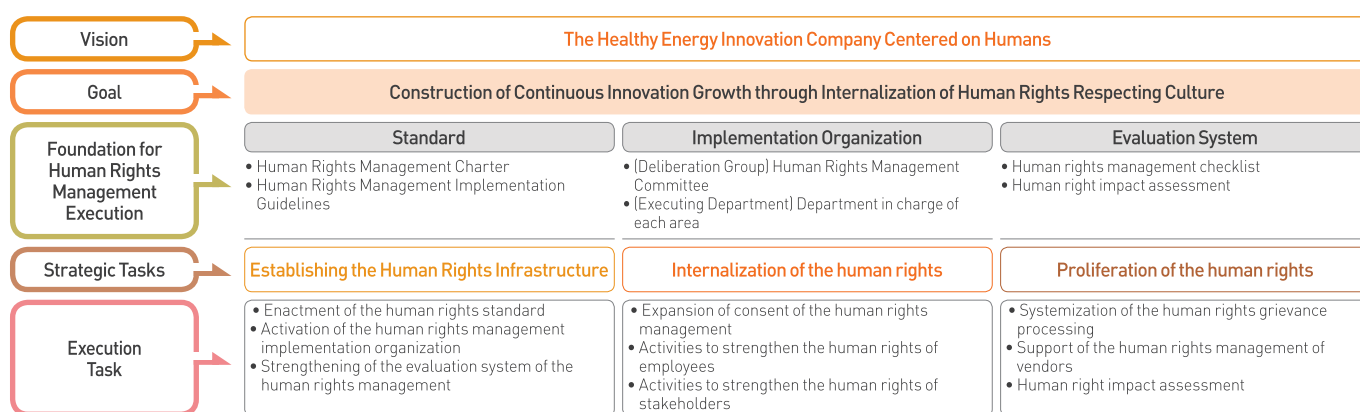
Human Rights Management Subjects and Scope

The subjects of KOWEPO's human rights management are all employees of KOWEPO, all corporations and natural persons having the direct and indirect interest to KOWEPO's management activities and include the employment, rights to work, occupational safety, supply chain, and local residents.

Establishing the Human Rights Infrastructure

Human Right Management System

KOWEPO as “The healthy energy innovation company centered on humans” as the human rights management vision and is committed to building a foundation for sustained innovative growth by internalizing the culture of respect for human rights. For that, KOWEPO established construction of the human rights infrastructure, internalization of the human rights management, and proliferation of the human rights management as three strategic tasks and generated the detailed execution plan for each strategic task.



Enactment of Human Rights Regulation

KOWEPO enacted the human rights regulation organized of five sections to define the matters needed for establishment and execution of the human rights management policies. Five sections include the General Provisions that describes the purpose, definition, and application scope of human the rights; the System for the establishment of the declaration and implementation plan for human rights management, the organization for the implementation, the education, and support; the Human rights Management Committee which is the highest decision making body for effective implementation of the human rights management; the Human Rights Remedies such as notification of the human rights infringements, handling of cases, and correction and disciplinary action; and the Human Rights Impact Assessment to identify and prevent potential risk factors that KOWEPO's management activities can affect human rights.

KOWEPO's Declaration of Human Rights
<p>We are a people-oriented healthy energy innovation company and fulfill its mission as a company respecting human rights in all management activities.</p> <p>To this end, we declare “human rights management that guarantees human dignity and value” and declare human rights management declaration as the standard of action and value judgment that all employees should observe.</p> <p>We manage with people first.</p> <p>We do not discriminate on the basis of disability, gender, race, religion, nationality, region, social status, education, age, occupation, etc. for employment and provide a working environment of mutual respect and consideration.</p> <p>We guarantee the freedom of association and collective bargaining of employees.</p> <p>We provide the safe and hygienic working environment.</p> <p>We prohibit forced labor or child labor of any form.</p> <p>We respect and protect the right to live, the freedom of movement, and the right to safety and property ownership of the residents in the area where we conduct a project.</p> <p>We strive to produce the human rights of consumers who consume the goods we produce.</p> <p>We strive to comply with environmental regulations in Korea and other countries and protect the environment and prevent pollution.</p> <p>We provide the convenient and safe power service to consumers and respect customer values by protecting personal information collected on business.</p> <p>We respect the human rights of residents of the project region in Korea and other countries and seek shared growth.</p> <p>We treat our business partners fairly and helps them practice human rights management.</p> <p>We will work with a responsible attitude to protect and respect the human rights of all our stakeholders wherever we work and pledge to do our best to settle and spread human rights management.</p>

Checklist for Human Rights Management Activities					
No.	Issue	Result			
		Yes	Supplementation Need	No	Not Applicable
1	Implementation of the human rights management system				
2	No discrimination in employment				
3	Guaranteed freedom of association and collective bargaining				
4	No forced labor				
5	No child labor				
6	Guaranteed occupational safety				
7	Responsible supply chain management				
8	8 Protection of the human rights of local residents				
9	9 Guaranteed right to environment				
10	Production of the human rights of consumers				
Total					

Internalization and Spread of Human Rights Management

KOWEPO is carrying out various projects specific to each area such as employment, female, safety, environment, vendor, and the local community to internalize the spread human rights management and strives to increase the awareness of the human rights and strengthen execution capability of its employees.

Support for improvement of the human rights of children

KOWEPO prohibits child labor of any form according to the regulation and supports the improvement of the human rights of children through the college student mentoring and maestro mentoring programs.

- Happy Weepy School which is the college student mentoring project for leaning guidance, career counseling, and emotional interchange with elementary school, middle school, and high school students in Taeon (2017-2018년, Phase 1: 20 mentors and 165 mentees, Phase 2: 20 mentors and 256 mentees, Phase 3: 20 mentors and 250 mentees)
- Dream over Dream which is the mentoring project to provide career education and opportunity for various experiences for vocational school students

Resolution of employment discrimination

KOWEPO prohibits discrimination on the basis of education, age, gender, and religion. We adopted blind hiring in 2015 to prohibit employment discrimination and carry out the policy to support the hiring of the vulnerable group.

- Blind hiring that eliminates prejudice against applicants by deleting education background, age, and gender in the application form
- Improvement of treatment and elimination of unreasonable discrimination by discussing the optimal conversion method for each job type for non-regular workers who are engaged in regular on-going work
- Social equilibrium hiring through a separate process for females in career break, local talents, disabled persons, and national meritorious

Improvement of the human rights management of vendors

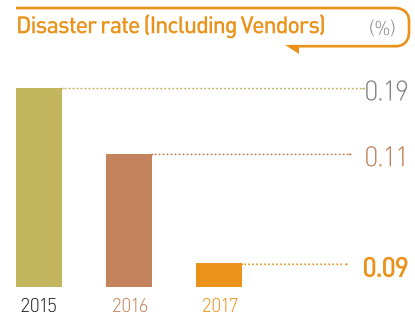
KOWEPO carries out the zero-accident campaign jointly with labor union and has introduced the smart safety management system for safety management of its vendors. We are conducting various support policies to establish the safe working environment of small vendors in particular.

- Up to KRW3 million to vendors for certification of safety and health management system certification
- Support for subscribing the disaster liability insurance (up to 75% of subscription cost for up to KRW5 million)
- 100% support of design safety cost for small projects

Improvement of the human rights of local residents

KOWEPO is carrying out various programs such as the job support for the elderly living alone and the vulnerable groups, culture and art performance, singing class, and support of electricity bill for the energy neglected group to improve the human rights of the residents in the power plant region.

- Establishment of Senior Happiness Dream through local agricultural and fishery cooperatives partnerships to create jobs for the elderly living alone and the neglected groups by carrying out projects such as the education on pet food production and cooking, feed production management support, and cohabitation with senior people to provide jobs like culture management and elderly caretakers
- Holding of Happy Family Concert with Taeon-gun and Taeon Culture and Art Center to provide the opportunity for the Taeon residents to view art performance (audience: more than 3,000 people)
- Installation of fire extinguishers and sensors and inspection of gas and electricity safety in agricultural and fishing villages (Taeon Thermal Power Complex Division)





- Singing class and free health food for each season “We wish you live happily to be 100 years old” (Taeon Thermal Power Complex Division)
- Regional Environmental Council in Cheongla New Town, Incheon “To Create Clean World” (Seoincheon Combined Cycle Power Complex Division)
- Support of electricity bill for energy vulnerable group (Gunsan Combined Cycle Power Division)

Improvement of the human rights for females and children

KOWEPO operates the work-family balance non-stop system, flexible work, and parental leave programs to help female professionals raise their children and has installed the family room and the office space dedicated to pregnant staff.

- Operation of “Work-Family Balance Non-stop System” to integrate the support for female staff from being pregnant to parental leave to prevent career break and work and family balancing of female employees
- Creation of nurture environment, introduction of various working modes such as flexible work, teleworking, and telecommuting, and designation of second and fourth Friday of each month as Family Day
- Creation of parent-friendly working environment by installing the family room which allows the employees to work with their children in the office and the office space dedicated to the pregnant so that the pregnant employee can take the rest when needed
- Group use of vacation and other campaigns for the use of vacation to help employees use vacation comfortably

Improvement of management and labor cooperation

KOWEPO carries out the policies to improve the productivity and welfare of employees through the discussion with the labor union.

- Operation of management-labor TF for compliance with government policy, improvement of productivity, and enhancement of working condition to identify the improvement opportunities such as job creation, wage system, HR policy, wage peak scheme, welfare, and clothing
- The management-labor council discussed and decided 159 cases such as the working through SNS after work hour, performance-based salary, and expansion of commuting bus

Future Plan for Human Rights Management

The goal of the human rights management of KOWEPO to build the foundation of continued innovation growth through the internalization of human respect culture. The improvement of the human rights of outside stakeholder is as important as the improvement of the human rights of inside stakeholder for innovation growth. As such, KOWEPO intends to continue its efforts for improving human rights of its vendors to create the human-centered healthy energy innovation company.

Building of the foundation for improving human rights of vendors

KOWEPO recognizes its vendors as the crucial business partner and is creating the collaborative cooperation culture. We will continue striving for building the foundation to improve human rights of vendors by supporting them for quality, environment, safety, and technology development for shared growth, evaluating the human rights when selecting new vendors, and supporting them for education on human rights development and enacting and operating the human rights management standard.

Strengthening of the integrated management system for each step

KOWEPO will establish the integrated management system strategy that reflects the characteristics of the human rights in the power industry for each strategy such as existing ethics management, sustainability management, and social contribution to internalize and proliferate the human rights management.

Welfare Benefits for Local Community

Education donation

KOWEPO Happy Weepy School

KOWEPO Happy Weepy School is the educational talent donation program in which the college student mentors nationwide provide the learning guidance, career counseling, and emotion interchange for the elementary school, middle school, and high school student in Taean, Chungnam Province where KOWEPO's head office is located. The mentoring program provides the learning opportunity and motivation to local mentee students and the opportunity to grow into the talent with the warmhearted personality and leadership for the college student mentors. Under the slogan of "We share yesterday's learning today," 60 college student mentors and about 700 local student mentees completed "KOWEPO Happy Weepy School" by phase 3 in July 2018. The program is very popular as shown by the high competition rate of 10 to 1 for mentor selection and the number mentees rapidly increased from 165 when the program began in the summer of 2017 to 270 in phase 3 in 2018, attracting the interest and positive response of local communities.

Dream over Dream Career Mentoring

"Dream over Dream Career Mentoring" is the close-up mentoring program that provides practical education on education and opportunities for experiential activities such as practical technology transfer and visits to industrial sites led by KOWEPO's quality maestros to the vocational school students. The Dream over Dream Career Mentoring program launching event held in April 2018 was participated by 160 students and the national quality maestros of KOWEPO to form the lasting mentoring relationship.

Support of free semester scheme - field trip to power plants

KOWEPO has developed the customized education and field trip program for the middle school student to support the free semester scheme sponsored by the Ministry of Education. 1,972 students from 14 middle schools visited in 2016 while 2,451 students from 19 middle schools visited in 2017 to help the students explore careers.

Culture Welfare

WP Emotion Generation School to Add Dream and Share Happiness - Promotion of culture and art clubs in local schools

KOWEPO has carried out "WP Emotion Generation School to Add Dream and Share Happiness" program to promote the culture and art clubs in local schools since July 2018. The program cooperates with Taean Office of Education and local schools to support the culture and art clubs in 16 schools to train future talents with artistic sensitivity and balanced personality for creativity and convergence in Taean region where the culture and art infrastructure are in shortage compared to other regions. The types of clubs sponsored by KOWEPO include orchestras, bands, dances, choruses, and fine arts. The bidirectional social contribution model in which the supported clubs donate their talents in local events and festivals.



WP Emotion Generation Plant - Small concert



WP Emotion Generation Plant - Talent donation



Agreement signing for KOWEPO Happy Weepy School



Cultural visits and job experience as part of KOWEPO Happy Weepy School



Signing ceremony for 2018 Dream over Dream Career Mentoring program



Culture and art performance for local communities

KOWEPO sponsored "Happy Family Music Concert" jointly with Taean-gun and Taean Culture and Art Center to provide the opportunity to view various cultural performances to local residents in the Family Month of May. The performance was an open concert for all audience and featured the performance by the Seoul Philharmonic Orchestra and the repertoire of classical music, musicals and traditional music to celebrate the sunny spring day to more than 3,000 spectators.

Social Contribution Activities

Social Contribution (Local Cooperation) Projects in 2017

	Main Projects	Project Description
Education	<ul style="list-style-type: none"> KOWEPO Happy Weepy School (learning mentoring for local students) Dream over Dream Career Mentoring Support of educational materials for elementary schools 	<ul style="list-style-type: none"> Learning, career, and emotional mentoring to local students (167 students) Support for career design of master high school (80 students) Providing educational materials and improving learning environment to elementary school
Culture	<ul style="list-style-type: none"> Sponsoring the teenagers from neglected families to view opera performance Sponsoring Family Concert with local residents 	<ul style="list-style-type: none"> Support of cultural activities of teenagers from neglected families Support of culture and art activities of local residents
Living	<ul style="list-style-type: none"> Support of mobile laundry truck for neglected groups Support of mobile vehicles for the disabled Support for residential environmental improvement projects 	<ul style="list-style-type: none"> Improvement of quality of life of neglected groups such as the elderly Support of vehicles to provide the right to move of the disabled Improvement of the residential environment of the neglected groups who are in the blind spots of welfare
Economy	<ul style="list-style-type: none"> Fish breed release project in 2017 Job creation for senior people 	<ul style="list-style-type: none"> Support for income of local community Creation of jobs for senior people by supporting the establishment of insect feed factory
Others	<ul style="list-style-type: none"> Sponsorship of Pyeongchang Winter Olympics and Paralympics Donation to help victims of the earthquake in Pohang 	<ul style="list-style-type: none"> Support of Winter Olympics and Paralympics Support of recovery of Pohang which suffered from the earthquake

Social Contribution (Local Cooperation) Projects in 2018

	Main Projects	Project Description
Education	<ul style="list-style-type: none"> KOWEPO Happy Weepy School (learning mentoring for local students) Dream over Dream Career Mentoring WP Dream Book Hope Sharing project 	<ul style="list-style-type: none"> Learning, career, and emotional mentoring to local students (520 students) Support for career design of master high school (80 students) Improvement of the learning environment of the local children's center and emotional support
Culture	<ul style="list-style-type: none"> Music festival for Taean residents WP emotional generation plant Support of local festivals 	<ul style="list-style-type: none"> Support of culture and art activities of local residents Support of promotion of culture and art clubs in local schools Promotion of tourism by supporting locally specialized festivals
Living	<ul style="list-style-type: none"> Reinforcement of safety facilities on the pine scent tracking course Distribution of air purifiers to local communities 	<ul style="list-style-type: none"> Reinforcement of safety facilities in Dulle tracking course to promote tourism Distributed to schools and welfare centers to cope with fine dust
Economy	<ul style="list-style-type: none"> WP Social Flower (development of sustainable sales channels) Jobs for senior people as part of cohabitation program Building of Korean smart farm using warm water from power plants Support of the production facility to the centers for self-sufficiency of the disabled Support of opening of flagship sharing cafe 	<ul style="list-style-type: none"> Increase of income and creation of jobs for local floriculture farms Creation of jobs for local senior people Increase of income and creation of jobs for local communities Creation of jobs for the disabled by supporting new production facilities Creation of jobs and support of self-sufficiency for the disabled
Others	<ul style="list-style-type: none"> Support of flood victims by a hydraulic power plant in Laos Support of the neglected groups to withstand the heatwave in the summer of 2018 	<ul style="list-style-type: none"> Support recovery of flooding damage in Laos Donation for the effort to prepare for the severe hot season of energy neglected group

KOWEPO supports the expansion of sales channels in Korea and other countries of small companies and contributes to the improvement of competitiveness by supporting the strengthening of organizational capabilities to create the culture of sharing growth between large and small companies. Moreover, KOWEPO introduced the collaborative settlement system to pay the small companies quickly as part of the fair trade policy.



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Strategy
for Shared Growth
with Small and
Medium Enterprises



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Expanding Sales Channel of
Small and Medium Enterprises



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Collaborative
Cooperation
with Local Enterprises



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Strengthening
the Competitiveness of
Small and Medium Enterprises

Performance (As of the end of 2017)

Rate of Purchasing of Products from
Small Companies



55%

Sales of Shared Outcomes



KRW **39.1**
billion

Collaborative Payment Rate



40%



81

Establishment of
Fair Trade Culture

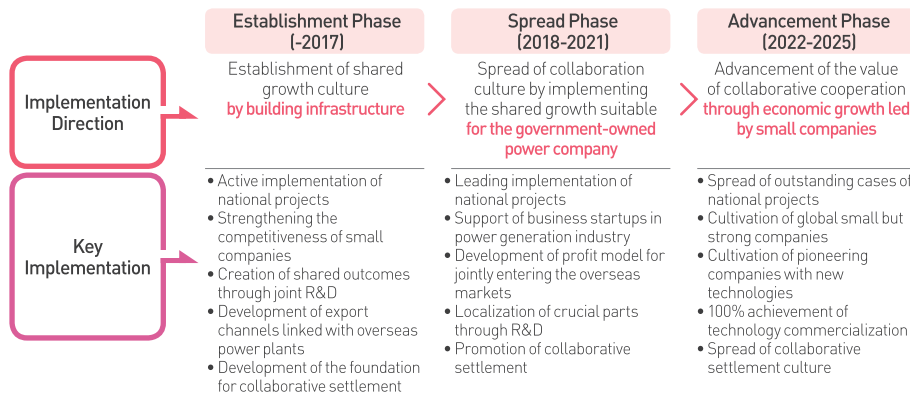
Establishing the Culture of Collaboration

Strategy for Shared Growth with Small and Medium Enterprises

With the vision for shared growth “To lead the change of economic ecosystem through collaboration with small companies,” KOWEPO is carrying out various programs such as the expansion of collaboration culture, development of creative technologies, customer communication, and support of sales channels. The Shared Growth Team in the head office collaborates with the power divisions and carries out joint projects with business councils and specialized agencies.

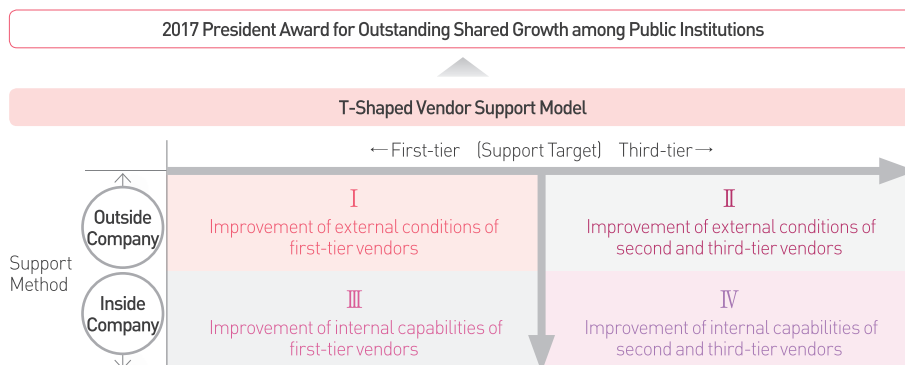
Implementation Strategy	To lead the Change of Economic Ecosystem through Collaboration with Small Companies			
Implementation Tasks	Spread of Collaboration Culture	Creative Technology Development	Customer Communication	Support for Development of Sales Channels
	<ul style="list-style-type: none"> Building of infrastructure of small companies Expanded creation of jobs in the private sector Development and spread of sharing of outcomes Improvement of fair trade and settlement practice 	<ul style="list-style-type: none"> Expansion of R&D of new technologies Expansion of outstanding product demonstration Implementation of the technical support system Implementation of integrated technology support system 	<ul style="list-style-type: none"> Improvement of customer communication and satisfaction Diversification of online and offline communication channel Identification of projects that reflect customer needs Strengthening internal capability 	<ul style="list-style-type: none"> Development of customized sales channel support Development of models to enter the overseas markets jointly Support of cooperative sales channels with relevant agencies Increased export linked to O&M

Mid- to Long-term Roadmap for Spread of Shared Growth



T-Shaped Vendor Support Model

KOWEPO is developing new shared growth T-shaped business models (broader and deeper) for practical support to help small vendors to grow to become small but strong companies. In recognition of its efforts, KOWEPO received the President Award for Outstanding Shared Growth among Public Institutions in 2017.



Performance Index (Measured)

	Establishment Phase ~2017	Spread Phase 2018~2021	Advancement Phase 2022~2025
Purchase rate of products from small companies	55%	70%	80%
Sales of shared outcome	KRW 39.1 billion	KRW 75.0 billion	KRW 140.0 billion
Export of cooperating companies	KRW 170.0 billion	KRW 210.0 billion	KRW 250.0 billion
Sharing of outcome	410 cases	600 cases	800 cases
Collaborative payment rate	40%	70%	80%

* Employment through direct payment of labor cost + employment through expanded shared growth business

Expansion of Support Targets

Expanded support of second and third-tier vendors

Large companies (50)	+	Tiny companies (400 locations)
Small companies (1,100)		

Specialization of Support Method

- ① (Outside) Improvement of business condition
 - Expansion of sales channel and improvement of procurement scheme
- ② (Inside) Strengthening of technical capability
 - Increase of productivity and improvement of technical competitiveness
- ③ (Inside) Innovation of employment environment
 - Improvement of employment condition and working culture

Expanding Sales Channel of Small and Medium Enterprises

Support for the development of overseas sales channel and expansion of export

Support for overseas sales channels in each step

KOWEPO has recognized the need to develop overseas sales channels to solve the problem of the decreased sales of its vendors due to the domestic market contraction. As such, we established the two-track support strategy that reflects the difference of export capability of vendors and carry out the export support program and overseas business-linked development of export channels.

Establishment of Base for Export by Starter Company

KOWEPO helps its vendors without export experience to received the Authorized Economic Operator (AEO) certificate to reduce the customs clearance of export item from 5 hours to 1 hour. We also established the import/export support system using the international trading insurance and provided the export insurance and guarantee to six vendors including Cofacs.

Expansion of Overseas Sales Channels of Intermediate Companies

KOWEPO supports the vendors, which already export their products, to participate in overseas exhibitions. We have supported six vendors including WETEX and consulted 196 vendors for export. KOWEPO has also supported five exporting vendors including INEM to establish overseas units as the base for export.

Support of Customized Export for Capable Vendors

KOWEPO has reflected the requirements of outstanding small exporters and formed the Overseas Sales Channel Council which supported 16 vendors including Handol Pump to enter the Vietnam and Thailand markets for the first time and supports the foreign legal services such as establishing factories (J/V), claim handling, and lawsuits through KOWEPO's advising law firm.

Development of Overseas Markets for Vendors

O&M Business

KOWEPO held the export workshop related to O&M projects in the Rabigh Power Plant in Saudi Arabia with the small but strong companies in Gyeonggi region area and small companies in Chungcheong region to link them with foreign buyers. As a result of the export workshop, the vendors such as Orbis signed the export contract for the amount of USD 310,000 and two vendors were registered as the official vendors of the Rabigh Power Plant.



Partnership with Large Exporters

KOWEPO signed the MOU for shared growth with large companies such as POSCO Energy, which already had a presence in Indonesia, to help KOWEPO's vendors register their products to the signed large companies. As a result, the vendors signed the purchase contract with four Indonesian companies for the total amount of USD 280,000.

PR Presentation of Outstanding Products

KOWEPO held the PR presentations of outstanding products from its vendors to provide the opportunity to expand the sales channels to small companies which had the excellent products and technologies but no sales channel or information. The PR presentations were held in each power generation complex of KOWEPO beginning in March 2018 and participated by 51 small vendors that owned the performance certification and technology development certification such as NEP (New Excellent Product) and NET (New Excellent Technology) to exhibit their products and technologies.

Collaborative Cooperation with Local Companies

Promotion in Gunsan Region

KOWEPO is striving to promote the economy in the GUsan region which is facing difficulties as more than 5,000 workers lost their job due to 56 vendors going out of business as a result of shipbuilding factories closing down.

Support for ship material suppliers to enter the power industry

KOWEPO held two purchase workshops in Gunsan Combined Cycle Power Division to help the shipbuilding vendors in Gunsan region to enter the power industry and registered them in the vendor pool to qualify them to participate in biddings. Moreover, it is carrying out various support programs such as the cooperation fund and loan for shared growth.

Registration of shipbuilding maintenance vendors for the power plant equipment

KOWEPO conducted consulting for the shipbuilding vendors in Gunsan region to switch to the power industry. As a result, six companies successfully registered as the qualified vendor for power generation equipment.

Signing of MOU for new & renewable business

KOWEPO has launched the task force team to cultivate the Gunsan region in job crisis into the mecca for new & renewable energy. We are trying jointly with Gunsan City and local companies to develop the joint new & renewable energy business using the idle ground.

Collaborative cooperation projects with small companies in Taeon-gun

Since KOWEPO moved its head office to Taeon-gun, it has conducted various collaborative cooperation projects for collaborative innovation with small companies located in Taeon-gun.

Targets of collaborative cooperation projects

For the collaborative cooperation projects, KOWEPO selected small companies with fewer than 20 employees and sales of less than KRW 3.0 billion while having good potential for future sales increase, employment, and contribution to local communities.

Selection of Participating Companies

The Project Selection Committee participated by KOWEPO, Taeon-gun, and Korea Productivity Center reviewed the documents submitted by the candidates and selected 34 companies.

Support for small companies

KOWEPO selected four companies for Manufacturing Innovation 3.0 and 20 companies for Industrial Innovation Movement I and II.

Outcomes

The collaborative cooperation projects resulted in the total sales increase of KRW 8.47 billion (KRW 249 million per company), equivalent to 8.4% of average sales increase per company, and creation of 28 new jobs.

Strengthening the Competitiveness of Small and Medium Enterprises

Improvement of competitiveness of small vendors

Projects to strengthen three core competencies

KOWEPO is executing the business competency, management competency, and technology competency strengthening projects to improve the competitiveness of its small vendors.

Type	Implementation Details	Outcome
Business Competency	<ul style="list-style-type: none"> Industrial innovation movement and productivity innovation partnership <ul style="list-style-type: none"> Improvement of productivity of second and third-tier vendors through consulting and equipment investment Cultivation of small companies for maintenance of power plants 	<ul style="list-style-type: none"> Executed from 2011 (participated by 157 member companies of Vendor Council) <ul style="list-style-type: none"> 407 tasks for the financial performance of KRW 18.3 billion Five new companies including Woojin Ntec registered as the maintenance vendor
Management Competency	<ul style="list-style-type: none"> Expansion of loan by Shared Growth Cooperation Fund (KRW 10.0 → 50.0 billion) Encouragement of core personnel to remain with the company with Naeil Chaeum Mutual Aid Strengthening of safety with disaster liability insurance project 	<ul style="list-style-type: none"> New loan to 192 companies including Sungil Turbine (reduced interest rate of 2.2%) 132 people from 35 companies (30 people to be added each year) Reduction of occupational accidents at 19 companies including ShinHeung
Technology Competency	<ul style="list-style-type: none"> Technology protection service project with the package to prevent leakage of core technology <ul style="list-style-type: none"> Business agreement with the technical protection agency of small and medium enterprises (September 29) Building of the technology infrastructure through the certification support 	<ul style="list-style-type: none"> Selection of 20 companies with the experience of technology leakage such as extortion <ul style="list-style-type: none"> Development of technology protection service and leakage prevention system 23 companies with NEP certification, Korean and international patent, and ISO certification

Expansion of purchase of products from small companies

KOWEPO actively purchase products from small companies and increased the purchase rate of small company products by 2.6%p from 53.5% in 2016 to 55.1% in 2017. KOWEPO is also actively expanding purchase products from companies owned by female and the disabled.

One-stop support for commercialization of technologies

KOWEPO implemented the one-stop support system for each step of business opportunity identification, R&D, and technology commercialization to help small companies commercialize the outcomes of creative and challenging technology development.

Implementation at Each Step

Step	Implementation Details			
Identification of Project Opportunity	<ul style="list-style-type: none"> Identification of new tasks by opening the current problems with the power plant equipment (20 cases selected) Expansion of participating companies through R&D project presentation (four presentations of R&D process) 			
Expansion of R&D	Task	Network-type common tasks	Joint R&D with five companies in the private and public sector	Focused R&D task
	Description	Specialized development with second and third-tier vendors	R&D to support small companies	To secure crucial technologies and solve current problems
	Output	Two companies including EcoPowerTech	10 new tasks for KRW 1.06 billion	20 new tasks for KRW 3.4 billion
Technology Competency	<ul style="list-style-type: none"> Selection of developments for commercialization of excellent products (6 cases including the bypass elbow of M501G combustion chamber) Technology transfer using the industrial property rights owned by KOWEPO (8 cases including the one-touch folding scaffold) Creation of new sales of KRW 10.2 billion for small companies through technology transfer 			

Strengthening the Competitiveness of Small and Medium Enterprises

Operation of Programs to Support Small Companies

Financial support for job creation

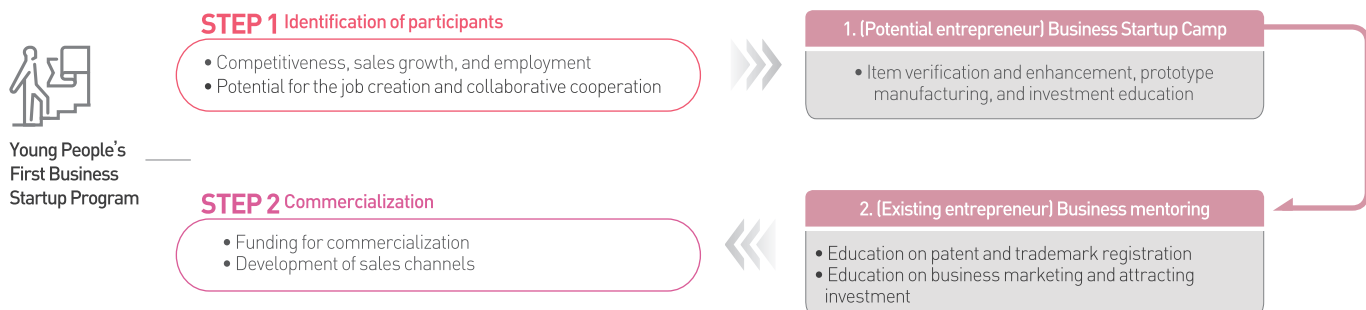
KOWEPO carried out the financial support project to create jobs using KRW 10.0 billion from its shared growth fund for small companies in Chungnam and created 105 new jobs as a result.

Naeil Chaeum Mutual Aid

KOWEPO is carrying out the Naeil Chaeum Mutual Aid project for the employees of small companies in which KOWEPO, employees, and participating vendors jointly deposit KRW 20 million for five years to stabilize the employment and resolve the wage gap. 30 new employees of vendors benefit from the project each year.

Young People's First Business Startup

KOWEPO is operating the Young People's First Business Startup program jointly with the Ministry of SMEs and Startups to support the emerging companies with the outstanding idea in power generation and energy by providing the one-stop service in all phases of the business from start to product manufacturing and PR. The program selected 10 potential business startup teams in new energy and provided KRW 650 million.



Establishment of Fair Trade Culture



Collaborative Settlement System

KOWEPO developed the collaborative settlement system designed for the bank to guarantee the payment so that the second and third-tier vendors could benefit from the low-interest rate that had been available only to large companies for a secured loan of credit sales. It also makes the payment to vendors fast. As a result of introducing the collaborative settlement system, the average time for the second and third-tier vendors to receive the payment decreased from 60 days to 5.9 days, and the collaborative settlement accounted for 62% of total payment. It was recognized as an outstanding case in the inspection of government offices in 2017.

Spread of Performance Sharing Scheme with Vendors

The performance sharing scheme is the collaborative cooperation system between large and small companies by the contracting company supporting the contracted company to achieve the goal agreed by the contracting and contracted companies and sharing the outcomes. KOWEPO is implementing three performance sharing schemes of multilateral collaboration, demonstration test support, and overseas sales channel support. The multilateral collaboration scheme plays an important role in improving the competitiveness of its vendors by supporting the member companies of KOWEPO Second and Third-tier Vendor Council. The demonstration test support scheme promotes commercialization of outstanding technologies owned by small companies and shares the outcomes. The overseas sales channel support scheme seeks to help the qualitative and quantitative growth of the vendors by supporting the development of customized overseas sales channels for small companies with outstanding products. The number of performance sharing tasks increased by 11%, making it 81, in 2017. A total of 80 companies including 55 new companies are participating in the performance sharing scheme.

Customized Bidding Evaluation

KOWEPO investigated the reason for 16.8% of small companies failing the bidding qualification review. As a result, it raised the scoring for the credit rating to 3 points and extended the approval period from 2 to 7 years and the delivery approval period from 5 to 7 years to enhance the competitiveness in bidding for small companies. We also have improved the evaluation scale of the technical personnel that had been calculated only by the number of employees and assigned 20% extra credit to the companies that have retained long-term technical personnel in employment.

Improvement of Unfair Contract Condition

KOWEPO has been improving unfair contracting conditions with small companies to establish fair trade practice. In details, we eliminated the double levying of compensation for delay, canceling the imposed compensation for delay if the project is completed within the contract period. We are also discussing with the government to lower the rate of compensation for delay. KOWEPO expects such efforts will reduce the burden of compensation for the delay of its vendors.

Transparency of Evaluation Committee Member Selection

KOWEPO is discussing with the Public Procurement Service for jointly using the technology evaluation committee member selection system to prevent the objective opinion of the evaluation committee member being involved in the bidding process. Furthermore, KOWEPO reflects automation of selection of evaluation committee members in the company rule and use the IT system to establish a fair and transparent bidding culture.

Corporate Culture

Promotion of Corporate Culture

KOWEPO strives to promote a corporate culture based on the slogan “Challenging & Creative KOWEPO” to create a working atmosphere with passion and to raise the level of employee satisfaction.

Corporate Culture Implementation System



Action Program

KOWEPO operates an action program for each practice task to fulfill the four core values of Passion for the Best, Challenge for Growth, Collaboration for the Future, and Trust through Communication.

Core Value	Practice Task	Action Program
Passion	Elimination of inefficiency in business	「Slim & Smart」 Efficient report and workflow 「HI meeting」 Enjoyable and smart meeting culture
Challenge	Innovation of working condition	「It's Golden Time!」 Introduction of focused working time 「Separate Yet Together」 Innovation in office space to encourage concentration in work
Collaboration	Cooperation of members	「Not Dis But Respect」 Establishment of the culture of mutual respect 「KOWEPO Person and Knowledge Person」 Knowledge and information sharing system
Trust	Improvement of organizational sense	「Clean and Confident KOWEPO」 Regular integrity communication channel between different levels 「I Hear You」 Breaking down the barrier within the organization through communication

Development of Human Resources

Key Attributes of KOWEPO Employees

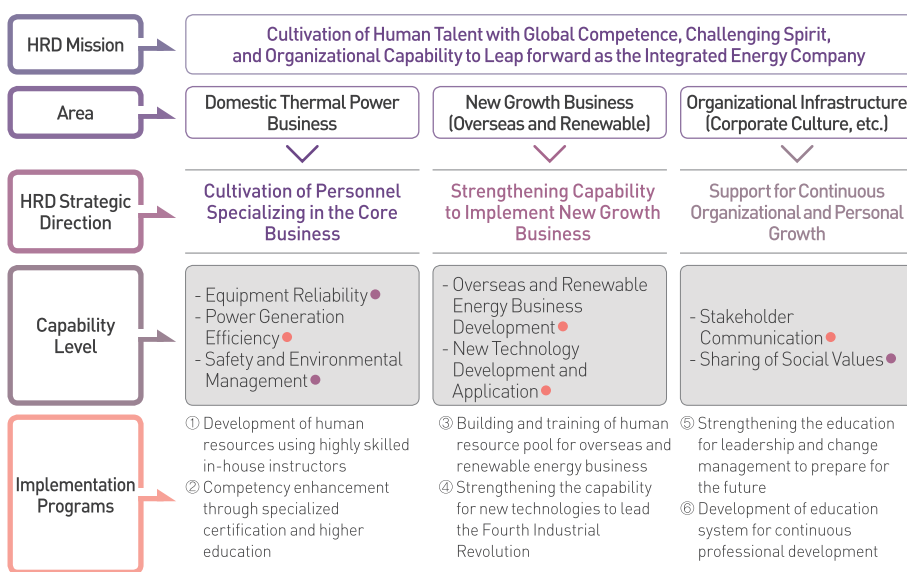
KOWEPO's ideal human talent is a person with global competence, challenging spirit, and organizational capability. We focus on cultivating our human resources to contribute to leaping forward as the integrated energy company by 2030.

Cultivation of human talents with global competence, challenging spirit, and organizational capability to contribute to **leaping forward as the integrated energy company by 2030**



Strategy and Operation System of Human Resource Development

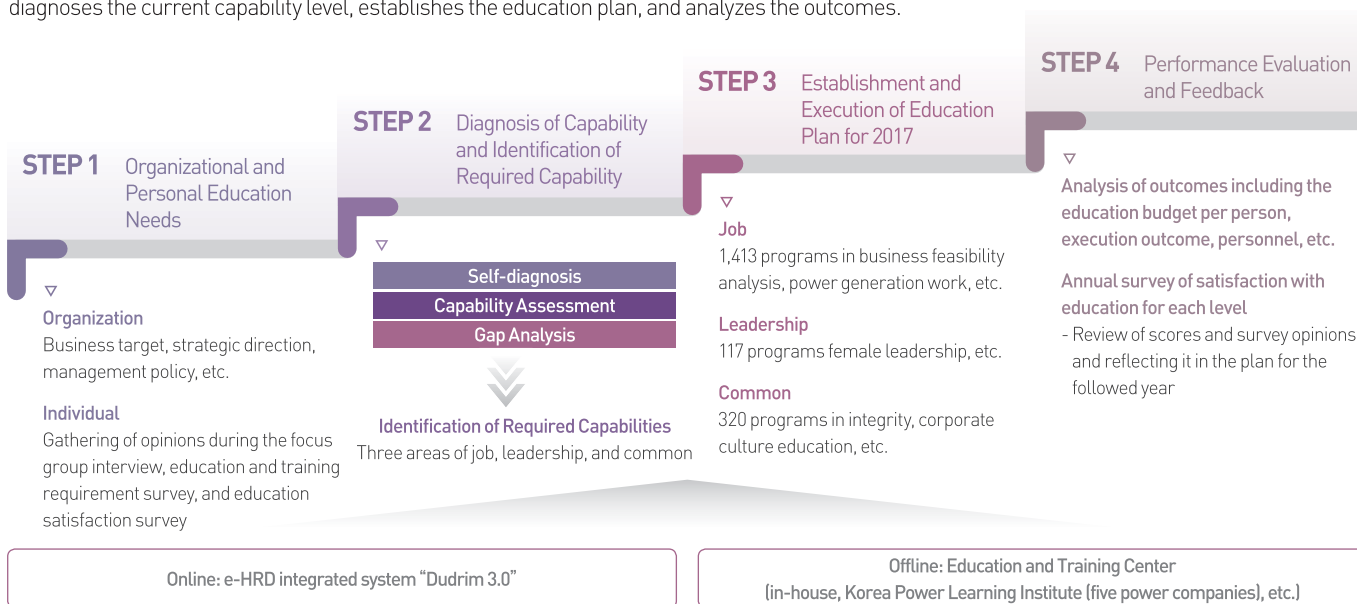
KOWEPO has established cultivation of professionals specialized in the core business, strengthening the competence to carry out new growth engines, and support of continued organizational and personal growth as the strategy for human resource development. We have identified the implementation programs and actively carrying them out to achieve the goal.



* Legend: Capability excellence — ● ● ● —

Human resource development system that reflects the educational needs and required capability

KOWEPO is operating the four-step human resource development system that identifies the required capability for each job by analyzing the organizational and personal educational needs, diagnoses the current capability level, establishes the education plan, and analyzes the outcomes.

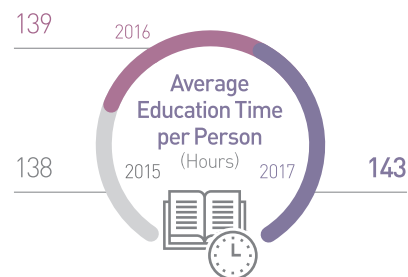
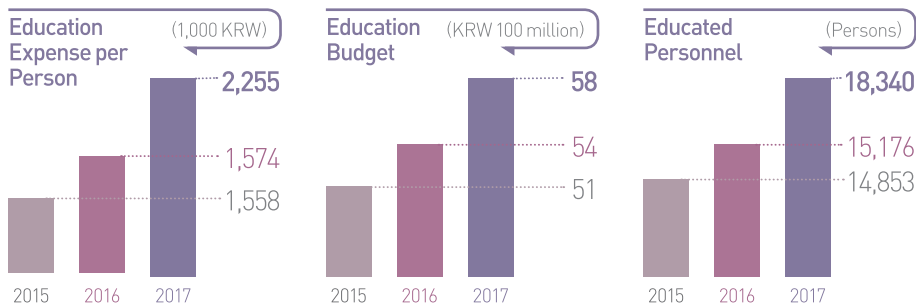


Enhancement of Power Generation Technology through Specialized Certification and Higher Education

KOWEPO provides motivation for improving the power generation technology capability by paying rewards to employees who have obtained the in-house (Grades 1-3 for power plant operation and maintenance) and international certification (equipment diagnosis Levels I-III) for each certificate level and stating the qualification in the personnel records. In addition, KOWEPO signed the agreement with three universities including Hanyang University to create Engineering MS program in power generation, safety, and environment.

Annual Education Outcome

As the results of human resource development programs, KOWEPO increased the education time per person, education expense per person, and educated personnel in 2017 over the previous year. The educated personnel, in particular, increased by 20.8%.



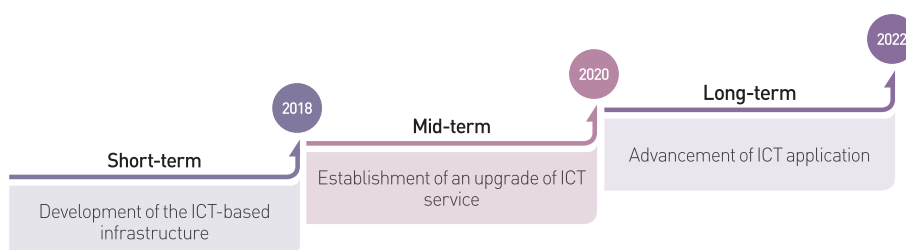
Promotion of work and family balance and improvement of the quality of life

KOWEPO is carrying out various programs such as the improvement of work productivity using ICT, promotion of annual vacation, and upgrading of flexible work to help the employees balance their work and life.

Pioneering Introduction and Operation of New IC to Improve Work Productivity

Mid to Long-term Roadmap

KOWEPO is developing the integrated information system to improve the work productivity and support decision-making of management.



Implementation

KOWEPO has identified nine strategic projects and 26 detailed projects and implements them in each year to develop the integrated information system. As of April 2018, KOWEPO has completed three projects for business support and three projects for power plant operation, and they have greatly increased business productivity.

Business support projects

- Reduction of cost settlement time by unifying the processes into a category accounting management system (288 hours annually)
- Reduction of field safety work duration by implementing the integrated worksite management system (2 hours → 10 minutes)
- Reduction of safety and quality document processing time by implementing the safety and quality collaboration system (2 days → 1 hour)

Power plant operations support projects

- Achievement of unplanned loss rate of 0.066% through better predictive diagnosis by implementing the M&P integrated monitoring system of power generation information
- Simplification of REC jobs and settlement process through the development of the RPS/REC integrated management system (5 levels → 1 level)
- Elimination of data error by improving the power generation data system (126 → 27 cases/year)

Improvement of Working Condition in the Field

- (Shift) Flexible personnel operation
→ Improved vacation use condition
- (Ordinary working) Inclusion of holidays in construction period
→ Exclusion of working on holidays
- Pilot testing of alternative off-days (off on weekdays if working on the weekend)

Campaign to Use Annual Vacation

- Use of group annual vacation (twice, participated by 80%), Refresh campaign (three times)
- Vacation usage of 55% in 2016
→ 64.3% in 2017 (9.3%p↑)
- Vacation usage by management level of 34.5% in 2016
→ 60.6% in 2017 (26.1%p↑)

Improvement of Long-term Work Practice

Promotion of the use of annual vacation

KOWEPO expanded the mandatory use of annual vacation from 13 days in 2016 to 15 days in 2017 and 25 days in 2018 to improve the prolonged working practice by allowing employees to use their vacation freely. As the result of improving the field working condition and carrying out the campaign to use annual vacation, the annual vacation usage rate is steadily increasing.

Promotion of work and family balance and improvement of the quality of life

Improvement of flexible working

KOWEPO revised the teleworking standard by deleting the workday restriction to create a flexible working environment. We also introduced the early off-work hour for "Family Day" which is every Friday and adopted flexible working using lunchtime to improve how people work.

Promotion of flexible work by using various working mode

(persons)

Type		2016 Performance	2017 Performance	Outcomes in 2017
Hourly work		34	31	• Surpassed the government target [1% of total employees]
Flexible work	Fixed work hours	432	688	• To encourage all employees to participate in "Family Day" - 169% increase in using flexible work - 452% increase in work hour selection
	Work hour selection	261	1,442	
	Concentrated working	44	55	
	Discretionary working	-	-	
Teleworking	Telecommuting and smart work	178	226	• 27% increase of teleworking

Family-friendly Management

KOWEPO operates a Gender Equality Policy Promotion Committee and task force team composed of various positions and jobs to promote creating the gender-equal working environment.

Career break prevention program

KOWEPO created a work and family balance non-stop system to prevent career break of employees by managing the process from pregnancy to parental leave to improve the employee convenience.



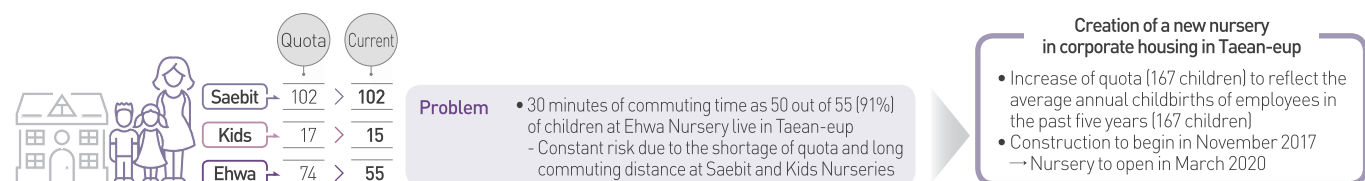
Improvement of childcare environment at workplace

KOWEPO strives to solve the childcare problem of its employees by creating a workplace that is friendly for childcare. We are providing institutional support through the adjustment of commuting time through flexible working, use of teleworking, and encouragement of parental leave, creating a corporate culture to use the policies freely. As a result, the number of employees benefiting from the parental leave increased from 48 in 2016 to 57 in 2017, and the males in parental leave also increased from 5 in 2016 to 7 in 2017.

Creation of Stable Childcare Environment by Expanding Nursery Facility

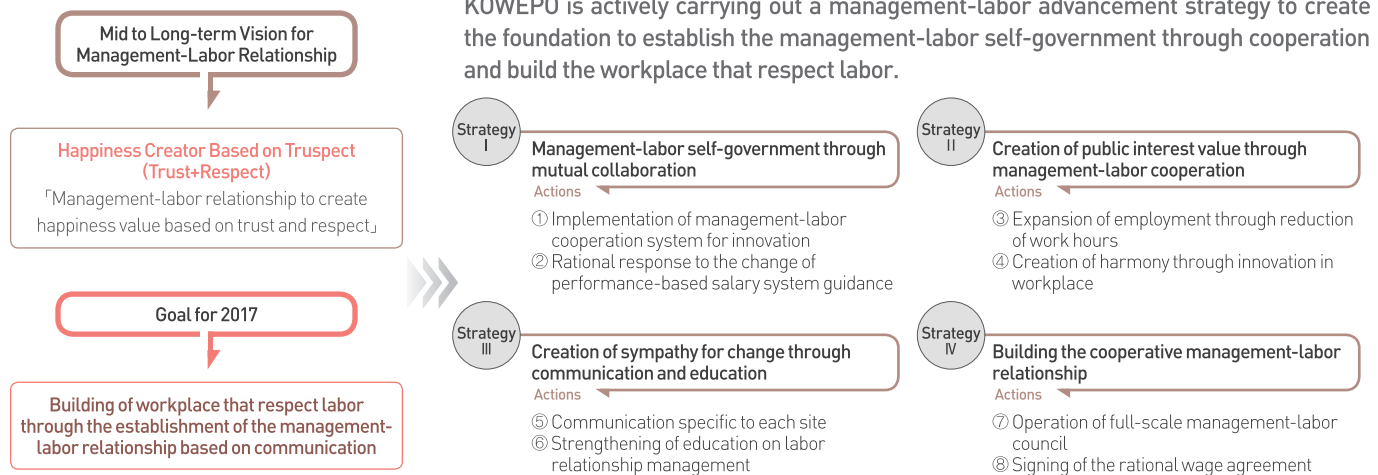
Workplace nurseries in Taejeon-gun

- HQ and Taejeon Thermal Power Complex Division: 3 nurseries



Labor Management Cooperation

Establishment of strategy to build a workplace respecting management-labor relationship



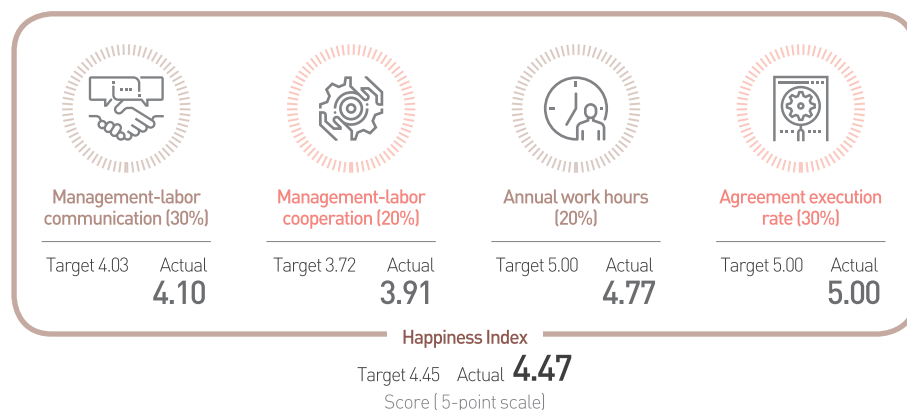
Diagnosis of Management-Labor Relationship Level

Improvement of the management-labor relationship index

KOWEPO changed the name of the index for the management-labor relationship level from Management-Labor Advancement Index to Management-Labor Happiness Index and added the reduction of work hours and execution of management-labor agreement to improve the accuracy.

Existing			After Improvement		
Name: Management-Labor Advancement Index Diagnosis: Survey (30 questions) + Measured index (1)			Name: Management-Labor Happiness Index Diagnosis: Survey (30 questions) + Measured index (2) Reduction of the portion of survey and change of the measured indices		
	Type	Reflection		Type	Reflection
Survey	Management-labor communication (10 questions)	20%	Survey	Management-labor communication (20 questions)	30%
	Labor-management cooperation (10 questions)	20%		Labor-management cooperation (10 questions)	20%
	Understanding of policy (10 questions)	20%	Measured index (new)	Work hour reduction	20%
Measured index	Consent to wage and collective agreement	40%		Collective agreement execution rate	30%
Problem <ul style="list-style-type: none">It is necessary to change the index operation to cope with the change of labor policy.The measured index "Consent to wage and collective agreement" is not the representative of the performance index since the consent rate differs according to each issue.			Goal of performance index: ① [Survey] Upward change of target from the average of the bottom 50% to the top score of the bottom 50% ② [Work hours] Reduction of work hours to match 1,890 hours of work hours specified as the national policy of the new administration ③ [Execution rate] 100% of achievement of management-labor agreement		

Measurement Result of Management-Labor Happiness Index



Collective Agreement

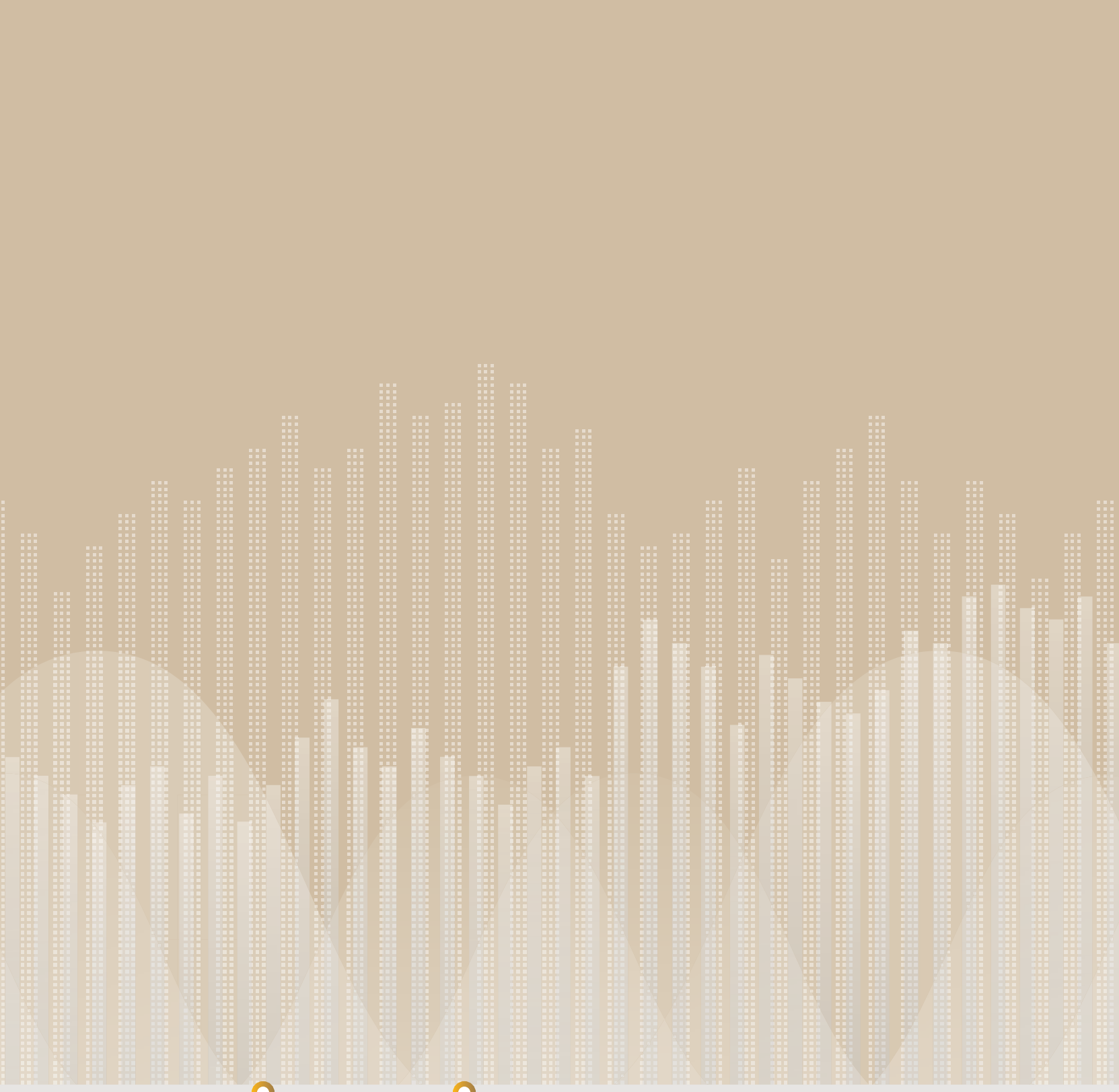
Enhancement of Rationality of Collective Agreement

KOWEPO reviewed the rationality of 120 provisions of collective agreement from zero bases with the third party consulting bodies (labor law firm and corporate law firm). The reviewed areas include the compliance with the labor law such as the Labor Standards Act, infringement of 55 checklists to prevent unchecked management, and operation excessive vacation and leave compared to the civil service rules.

Management-Labor Agreement Operation

KOWEPO implemented 100% of 189 items agreed by the task force team and council.

Type			Major Agreement	Agreement	Implementation
Management-Labor T/F Team	Compliance with government policies	Creation of Good Jobs T/F Team	<ul style="list-style-type: none">• Agreement to create new job by reducing overtime work and promoting use of annual vacation• Agreement to hire 30 people in 2018, 30 in 2019, and 40 in 2020 within the specified labor cost	2cases	2cases
		Wage System Improvement T/F Team	<ul style="list-style-type: none">• Expansion of portion of job-based pay to create the job-centered wage system• Encouragementtouseannualvacation(15→18days)	7cases	7cases
	Improvement of productivity	Upgrading of HR system T/F Team	<ul style="list-style-type: none">• Supplementation of personnel shortage (hiring of 133 new employees in the second half period)• Improvement of recommended promotion and selection (beginning in 2018)<ul style="list-style-type: none">- (Existing) Not implemented if there are two or fewer candidates- (Improved) Promotion according to capability regardless of the number of candidates	5cases	5cases
		Wage Peak Improvement T/F Team	<ul style="list-style-type: none">• Improvement of education of subject to wage peak (creation of education to support career switch)• Improvement of working condition by increasing the use of flexible working by TSO* position	6cases	6cases
	Working Condition Improvement	Welfare Improvement T/F Team	<ul style="list-style-type: none">• Improvement of residential condition such as corporate housing remodeling and fitness facility expansion• Direct management of cafeteria and improvement of summer fitness training center	6cases	6cases
		Clothing Improvement T/F Team	<ul style="list-style-type: none">• Identification of improvement measures through benchmarking of power affiliates and vendors• Reflection of employee needs through the clothing exhibition in all power plants	4cases	4cases
Management-Labor Council			<ul style="list-style-type: none">• Prohibition of work order communication using SNS after work hours• Promotion of social contribution through talent donation by music club, etc.• Elimination of performance-based wage system and return of bonus for early adoption• Improvement of working conditions at workplaces (expansion of commuting bus operation, etc.)	159cases	159cases
Total				189cases	189cases



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Economic Performance Index
Environmental Performance Index
Social Performance Index



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GRI_Index
Third Party Assurance Statement
Awards
Participating Associations

APPENDIX

Economic Performance Index

Consolidated Financial Statements

	Subject	Unit	2015	2016	2017
Asset	Current assets	KRW million	985,330	1,174,859	1,066,099
	Non-current assets	KRW million	8,222,542	8,618,244	8,562,572
	Total assets	KRW million	9,207,872	9,793,103	9,628,671
Capital and Liability	Total capital	KRW million	3,882,393	3,923,278	3,485,986
	Current liabilities	KRW million	1,370,157	1,650,501	1,297,361
	Non-current liabilities	KRW million	4,351,729	4,219,324	4,448,917
	Total liabilities	KRW million	5,721,886	5,869,825	5,746,278

Consolidate Profit & Loss Statement

Subject	Unit	2015	2016	2017
Sales	KRW million	4,224,674	4,179,782	4,222,449
Cost of sales	KRW million	3,653,430	3,487,049	3,748,802
Selling and administrative expenses	KRW million	82,344	104,072	112,163
Operating income	KRW million	488,900	588,661	361,484
Other income	KRW million	3,689	3,986	4,732
Other expenses	KRW million	443	642	6,123
Other profits	KRW million	1,535	4,815	-9,351
Financial income	KRW million	124,642	62,490	172,248
Cost of financing	KRW million	192,849	134,826	311,071
Equity method income	KRW million	-13,169	-13,170	-63,001
Net profit before tax	KRW million	412,305	511,314	148,918
Corporate tax	KRW million	111,996	118,120	46,089
Net profit	KRW million	300,309	393,194	102,829
Accumulated other comprehensive income	KRW million	2,784	-3,196	25,771
Total comprehensive income	KRW million	303,093	389,998	128,600

Sales of Each Business

Subject	Unit	2015	2016	2017
Power generation product	KRW million	4,114,488	4,080,385	4,076,435

Shareholders

Subject	Unit	2015	2016	2017
KEPCO	%	100	100	100

Government Subsidy

Subject	Unit	2015	2016	2017
Subsidy	KRW 100 million	0	0	0

Economic Value Distribution

	Subject	Unit	2015	2016	2017	Remark
Stakeholders Distribution	Economic value creation	KRW 100 million	43,886	42,697	44,640	Sum of sales and other income
	Vendors	KRW 100 million	36,628	34,268	37,810	Amount of all products and services purchased by KOWEPO for its business
	Employees	KRW 100 million	1,748	2,056	2,452	Wage, retirement benefit, and welfare expense
	Shareholders and investors	KRW 100 million	1,068	1,379	1,514	Interest to the creditor
	Government	KRW 100 million	1,324	1,408	696	Tax and duties and corporate tax based on the financial statements
	Reinvestment	KRW 100 million	3,112	3,580	2,107	Source for future reinvestment and retaining of profits
	Local community	KRW 100 million	4	6	61	Contribution to local communities
	Total	KRW 100 million	43,884	42,697	44,640	

Industrial Property Right Application and Registration

Subject		Unit	2001~2017 Accumulations
Patents	Applied	Cases	397
	Registered	Cases	279
Utility model	Applied	Cases	123
	Registered	Cases	100
Design	Applied	Cases	16
	Registered	Cases	15
Trademark	Applied	Cases	4
	Registered	Cases	5

Overseas Sales and Portion

Subject	Unit	2015	2016	2017
Overseas sales	KRW 100 million	247	346	872
Portion	%	0.54	0.81	0.93

Power Plant Operation

Subject	Unit	2015	2016	2017
Sales	GWh	46,131	47,450	44,098
Cost of sales	Won/KWh	89.2	86.0	92.3
Failure rate	%	0.121	0.055	0.074
Unplanned loss rate	%	0.307	0.076	0.066
Operating rate	%	81.6	89.2	91.4
Utilization rate	%	59.0	59.2	48.6
Heat efficiency	%	41.09	40.27	40.34
Station power rate	%	4.29	4.51	5.60

Installed Capacity and Power Generation

Subject			Unit	2015	2016	2017
Installed Capacity			MW	9,322	10,725	11,780
Power Generation	Fossil Fuel	Coal		32,462	33,023	38,755
		LNG	GWh	11,923	11,778	6,638
		Oil		3,578	5,187	1,082
	New & Renewable		GWh	129	571	1,461
	Total Generation		GWh	48,092	50,559	47,936

Average Operating Rate of Each Power Plant

Subject	Unit	2015	2016	2017
Taeon Thermal Power	%	92.0	90.3	89.7
Pyeongtaek Thermal Power	%	94.7	75.9	91.4
Pyeongtaek Combined Cycle	%	90.6	95.9	94.5
Seoincheon Combined Cycle	%	96.0	89.5	96.6
Gunsan Combined Cycle	%	74.8	94.9	85.6
Others	%	-	-	-
Total	%	91.6	89.2	91.4

Environmental Performance Index

Investment in Environmental Facilities

Subject	Unit	2015	2016	2017
Energy industry and new & renewable power generation	KRW 100 million	2,274	1,307	811
New energy industry R&D (R&D Department)	KRW 100 million	8.9	10.9	12.2
Greenhouse gas reduction R&D (R&D Department)	KRW 100 million	2.7	3.7	0.5
Emission right trading cost (Climate Change & Environment Team)	KRW 100 million	18	84	186
RPS mandatory implementation cost (New and Renewable Energy Managing Team)	KRW 100 million	757	1,322	1,754
Total	KRW 100 million	3,060.6	2,727.6	2,763.7

* The education and training cost is included in the operating cost. / * RPS mandatory implementation cost applied the REC outside purchase amount.

Greenhouse Gas Emission

Subject	Unit	2015	2016	2017
SCOPE 1 (direct emission)	10,000 tCO ₂ eq	3,367	3,642	3,678
SCOPE 2 (indirect emission)	10,000 tCO ₂ eq	18	27	18
Total	10,000 tCO ₂ eq	3,385	3,669	3,696
Basic unit	tCO ₂ eq/GWh	734	758	812

* The greenhouse gas emission applies the greenhouse gas emission calculation standard in "Greenhouse Gas and Energy Target Management Scheme."

* SCOPE 3: Other indirect emission that is not included in indirect emission of HFCs and SF₆

* Greenhouse gas basic unit: Greenhouse gas emitted to produce 1GWh electricity

Emission Rate Trading Scheme

Subject	Unit	2015	2016	2017
Allocated	10,000 tCO ₂ eq	3,414	3,532	3,795
Emission	10,000 tCO ₂ eq	3,385	3,669	3,696

* Allocated: Amount allocated for greenhouse gas energy emission trade

Greenhouse Gas Emission by Each Energy Source

Subject	Unit	2015	2016	2017
Solid(coal, etc.)	10,000 tCO ₂ eq	2,666	2,831	3,324
Liquid(heavyoil, etc.)	10,000 tCO ₂ eq	243	351	78
Vapor (natural gas)	10,000 tCO ₂ eq	445	447	264
Others (limestone, purchased power, etc.)	10,000 tCO ₂ eq	31	40	30
Total	10,000 tCO ₂ eq	3,385	3,669	3,696

* The greenhouse gas emission applies the greenhouse gas usage calculation standard in "Greenhouse Gas and Energy Target Management Scheme."

Energy usage

Subject	Unit	2015	2016	2017
Fuel	TJ	421,016	443,255	426,960
Electricity (including others)	TJ	19,785	21,340	25,761
Total	TJ	440,801	464,595	452,721
Basic unit	TJ/GWh	9.17	9.19	9.44

* Greenhouse gas basic unit: Use amount of greenhouse gas emitted by production of 1GWh electricity

Energy Production by Each Energy Source

Subject	Unit	2015	2016	2017
Solid (coal, etc.)	TJ	300,335	314,534	369,999
Liquid (heavy oil, etc.)	TJ	33,199	47,842	10,838
Vapor(naturalgas)	TJ	87,519	88,007	51,626
Others	TJ	3,746	5,619	3,796
Total	TJ	424,799	456,002	436,259

Fuel Use

Subject		Unit	2015	2016	2017
Power Generation Fuel	Bituminous coal	1,000 tons	12,546	12,810	15,567
	Heavy oil	1,000 KL	777.7	1,129.2	243.0
	LNG	1,000 tons	1,613.6	1,625.1	962.4
	Bio heavy oil	1,000 KL	5.0	4.3	-
	Organic solid fuel	1,000 tons	71.9	85.2	81.7
	Wood pallets	1,000 tons	188.7	179.5	108.5
Power plant water		1,000 tons	8,409	10,284	9,410
Limestone		1,000 tons	293	282	258
Chemicals		1,000 tons	15	20	19

Atmospheric Pollutant Emission

Subject		Unit	2015	2016	2017
Atmospheric pollutant emission level	N0x	1,000 tons	24.7	19.1	12.5
	SOx	1,000 tons	15.0	11.9	9.1
	Dust	1,000 tons	0.9	0.7	0.7
Basic unit emission level	N0x	kg/GWh	515	378	261
	SOx	kg/GWh	313	235	190
	Dust	kg/GWh	19	14	15

Water Pollutant Emission

Subject		Unit	2015	2016	2017
Water pollution emission level	COD	ton	16.9	19.1	19.7
	SS	ton	2.8	10.3	7.5
	T-N	ton	11.6	16.8	15.1
	T-P	ton	0.073	0.076	0.395
Basic unit emission level	COD	g/GWh	353	377	412
	SS	g/GWh	59	205	156
	T-N	g/GWh	243	331	316
	T-P	g/GWh	2	2	8

Water Usage by Each Power Plant

Subject		Unit	2015	2016	2017
Taeon Thermal Power Complex Division		1,000 tons	6,219	7,732	7,777
Pyeongtaek Thermal Power Complex Division		1,000 tons	1,660	1,919	1,192
Seoincheon Combined Cycle Power Complex Division		1,000 tons	315	351	276
Taeon Thermal Power Complex Division		1,000 tons	215	281	165
Total		1,000 tons	8,409	10,284	9,410
Basic unit		ℓ/MWh	175	204	197

Waste Recycling

Subject		Unit	2015	2016	2017
Generation		1,000 tons	1,320	1,391	1,699
Recycling		1,000 tons	1,350	903	1,715
Recycling rate		%	102	65	101

Industrial Accident Rate

Subject		Unit	2015	2016	2017
National occupational accident rate		%	0.50	0.49	0.48
KOWEPO	Industrial Accident Rate	%	0.20	0.11	0.07
	Occupational Accident Rate	%	0.02	0.02	0.01

※ Occupational disaster rate of the whole supply chain including the vendors and contractors

Employee Safety

Subject		Unit	2015	2016	2017
Death per 10,000 people		‰	0	0	0
Number of safety accidents		Case	2	-	-

Social Performance Index

Employees

As of December 31, 2017

Subject			Unit	2015	2016	2017
Total number of employees			Persons	2,077	2,177	2,352
Employment Type	Regular	Male	Persons	1,836	1,922	2,069
		Female	Persons	241	255	283
Minority Status	Rate of the disabled		%	3.28	3.48	3.43
	Rate of females		%	12.2	12.6	12.8
	Female manager (Senior manager or higher)		Persons	27	30	30
	Rate of female managers %		%	4.1	4.4	4.4

Employee Hiring and Turnover

Subject			Unit	2015	2016	2017
New Employee Hiring	Office workers	New graduates	Persons	7	14	24
		Experienced		0	2	1
	Technical	New graduates	Persons	78	106	166.75
		Experienced		2	1	0
	Others	New graduates	Persons	10	8	7
		Experienced		0	2	0

Social Equilibrium Hiring

Talents from regions outside of capital	Persons	54.5	52.5	89
People of national merit	Persons	10	7	20.75
High school graduates	Persons	23	29.25	24.75
Disabled	Persons	6	7.5	4.75
Female	Persons	15	25.5	32.5

Subjects Applicable to Collective Bargaining and Members of Labor Unit

Applicable employees	Persons	1,455	1,508	1,658
Members of labor union	Persons	1,434	1,475	1,615
Labor union enrollment rate	%	98.5	97.8	97.4

※ Labor union enrollment rate: Rate of labor union members to the total number of employees except those at the senior manager or higher position

Employment Stability

Subject	Unit	2015	2016	2017
Average years of service	Year	14.6	14.5	14.2
Employee turnover rate	%	1.1	1.2	0.8

Operation Related to Childbirth and Parenting

Subject		Unit	2015	2016	2017
Maternity leave (Female employees)	Users	Persons	23	18	15
	User rate	%	9.5	7.0	5.3
Spouse Maternity leave	Users	Persons	80	72	72
	User rate	%	4.4	3.7	3.5
Subfertility	Users	Persons	1	-	1
	User rate	%	0.05	-	0.05
Parental Leave	Males	Persons	5	5	7
	Females	Persons	37	43	50
	Total persons	Persons	42	48	57
	Return after parental leave	%	95.23	100	98.24

Subject		Unit	2015	2016	2017
Subfertility leaves		Persons	-	-	-
Reduced work for parenting		Persons	-	-	3

Subject		Unit	2015	2016	2017
Use of long-term leave (5 days or longer)		Persons	283	521	532

Flexible Working Operation

Subject		Unit	2015	2016	2017
Time selection		Persons	31	38	35
Time lapse commuting		Persons	323	432	688
Working time selection		Persons	245	261	1,442
Concentrated work		Persons	39	44	55
Telecommuting		Persons	66	135	188
Smartwork		Persons	27	43	38

Support of Overseas Marketing for Small Vendors

Subject		Unit	2015	2016	2017
Counseling outcome		USD million	130,771	545,260	223,171
Contract outcome		USD million	37,407	61,594	38,641
Supported companies		Companies	150	87	92

Shared Growth

Subject	Unit	2015	2016	2017
Funding support for R&D	KRW 100 million	26.5	41.9	45.8
Purchase of outcome of joint R&D with small companies	KRW 100 million	10.7	18.5	10

Green Product Purchase Rate

Subject	Unit	2015	2016	2017
Total purchase※	KRW 100 million	25.0	31.1	16.5
Green products	KRW 100 million	24.6	30.3	16.0
Rate	%	98	97	97

※ Total purchase: Purchase of green product items designated by the Ministry of Environment

Socially Responsible Purchase

Subject	Unit	2015	2016	2017
Products from small companies	KRW 100 million	1,911	2,075	2,749
R&D products	KRW 100 million	200	257	258
Products from companies owned by females	KRW 100 million	277	289	309
Products from companies owned by the disabled	KRW 100 million	25	14	63

Contract Transparency

Subject	Unit	2015	2016	2017
Total number of contract	Cases	1,193	1,238	1,233
Negotiated contracts	Cases(%)	293(25%)	346(28%)	343(28%)
Competitive bidding	Cases(%)	900(75%)	892(72%)	890(72%)

Ethics Management Evaluation

Subject	Unit	2015	2016	2017
Assessment of integrity (ACRC)	Points	8.45	8.42	8.28
Assessment of policy to prevent corruption (ACRC)	Grade	II	I	II

Human Resource Development

Subject	Unit	2015	2016	2017
Average education hours per person	Hours	138	139	143
Education cost per person	1,000 KRW	1,558	1,574	2,255
Education budget	KRW 100 million	51	54	58
Educated personnel	Persons	14,853	15,176	18,340

Electronic Bidding

Subject	Unit	2015	2016	2017
Total number of bidding	Cases	1,193	1,238	1,233
Total number of electronic bidding	Cases	1,189	1,234	1,230
Rate of electronic biddings	%	99.6	99.7	99.7

Social Responsibility

Subject	Unit	2015	2016	2017
Donation	KRW 100 million	4.4	6.4	61
Funds participated by employees	KRW 100 million	1.2	1.1	1.4
Employees in voluntary services	Hours	1,994	2,024	2,046
Service time	Hours	35,303	36,569	35,710
Average voluntary service hour per person	Hours	17.70	18.07	17.45

※ Funding of KRW 5.3 billion to the Farming and Fishery Collaborative Cooperation Fund in 2017 under the provisions of the Special Act on Assistance to Farmers, Fishers, Etc. Following the Conclusion of Free Trade Agreements

Support to Local Communities

Subject		Unit	2015	2016	2017
Support of communities around power plants		KRW 100 million	36	30	32
Energy welfare of neglected groups		KRW 100 million	1	1.3	1.9
Purchase of Onnuri gift certificate		KRW 100 million	5.3	6.3	7.4
Purchase of products from socio-economic companies	Social enterprise	KRW 100 million	37.6	59.2	82.0
	Cooperatives	KRW 100 million	0.2	1.9	2.7

GRI_Index

GRI Standard Index	Contents	Page	Remarks
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	102-6 Markets in which KOWEPO provides services (including geographical distribution, industry, customer and beneficiary type, etc.)	8, 9, 10, 11	
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	102-11 Statement on preventive access or principle and description of how it is stated	5	
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GRI Standard Index	Contents	Page	Remarks
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	201-2 Financial impact and other risks and opportunities of climate change to organization's activities	51	
	201-3 Coverage of the organization's defined benefit plan obligations	-	
	201-4 Government subsidy	90	
Market Status	202-1 Ratios of standard entry level wage compared to local minimum wage at locations of significant operation	19	
	202-2 Proportion of senior management hired from the local community	95	
Indirect Economic Impact	203-1 Development and impact of SOC investment and support service 7, 90	7, 90	
	203-2 Significant indirect economic impacts	90	
Spending on Social Enterprises	204-1 Expenditure on social enterprises, SMEs, women enterprises, etc.	97	
Anti-corruption	205-1 Total number and percentage of operations assessed for risks related to corruption and the significant risks identified	20	
	205-2 Communication and training on anti-corruption policies and procedures	20, 21	
	205-3 Confirmed incident of corruption and actions taken	None	
Environmental			
Materials	301-1 Materials used by weight or volume	93	
	301-2 Percentage of materials used that are recycled input material	94	
	301-3 Ratio of recycling of sold product and related packaging material	Not applicable	
Energy	302-1 Energy consumption within the organization	93	
	302-2 Energy consumption outside the organization	-	
	302-3 Energy intensity	93	
	302-4 Reduction of energy consumption	49, 93	
	302-5 Reductions in energy requirements of products and services	Not applicable	
Water	303-1 Total water withdrawal by source	94	
	303-2 Water sources significantly affected by the withdrawal of water	94	
	303-3 Percentage and the total volume of water recycled and reused	-	
Biodiversity	304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	Not applicable	
	304-2 Description of significant impacts of activities products and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas	Not applicable	
	304-3 Habitats protected or restored	Not applicable	
	304-4 Total number of IUCN Red List species and national conservation list species with habitats in areas affected by operations, by the level of extinction risk	Not applicable	
Emissions	305-1 Direct greenhouse gas (GHG) emissions (SCOPE 1)	92	
	305-2 Indirect greenhouse gas (GHG) emissions (SCOPE 2)	92	
	305-3 Other indirect greenhouse gas (GHG) emissions (SCOPE 3)	-	
	305-4 Greenhouse gas (GHG) emissions intensity	92	
	305-5 Reduction of greenhouse gas (GHG) emissions	92	
	305-6 Emissions of ozone-depleting substances	-	
	305-7 NOx, SOx, and other significant air emissions	93	
Effluents and Waste	306-1 Total water discharge by quality and destination	94	

GRI Standard Index		Contents	Page	Remarks
Effluents and Waste	306-2	Total weight of waste by type and disposal method	94	
Compliance with Environmental Regulation	307-1	Monetary value of significant fines and the total number of non-monetary sanctions for noncompliance with environmental laws and regulations	None	
Environmental Assessment of Supply Chain	308-1	Rate of new suppliers that conducted the environmental assessment	-	
	308-2	Actual or potentially significant negative environmental impact and actions in the supply chain	-	
Social				
Employment	401-1	Total number and rates of new employee hire and employee turnover	95	
	401-2	Benefits provided only to full-time employees	84	
	401-3	Return to work and retention rates after parental leave by gender	96	
Labor Management	402-1	Minimum notice periods regarding operational changes	None	
Occupational Safety and Health	403-1	Percentage of total workforce represented in formal joint management-worker health and safety committees that help monitor and advise on occupational health and safety	-	
	403-2	Type of injury and rates of occupational diseases, lost days, and absenteeism, and the total number of work-related fatalities, by region and by gender	59	
	403-3	Workers with high incidence or high risk of diseases related to their occupation	None	
	403-4	Health and safety topics covered in formal agreements with trade unions	56	
Training and education	404-1	Average hours of training per year per employee by gender, and by employee category	47, 98	
	404-2	Programs for skills management and lifelong learning that support continued employability of employees and assist them in managing career endings	46	
	404-3	Percentage of employees receiving regular performance and career development reviews by gender and by employee category	100%	
Diversity and Equal Opportunity	405-1	Composition of governance bodies and breakdown of employees by employee category according to gender, age group, minority group membership	46, 95	
	405-2	Ratio of basic salary and remuneration of women to men by employee category	Same	
Equal Opportunity	406-1	Total number of incidents of discrimination and corrective actions taken	No related cases	
Freedom of Association and Collective Bargaining	407-1	Operations and suppliers identified in which the right to exercise freedom of association and collective bargaining may be violated or at significant risk and measures taken to support these rights	87, 88	
Child Labor	408-1	Operations and suppliers identified as having significant risk for incidents of child labor, and measures taken to contribute to the effective abolition of child labor	No child labor	
Forced or Compulsory Labor	409-1	Operations and suppliers identified as having significant risk for incidents of forced or compulsory labor, and measures taken to contribute to the elimination of all forms of forced or compulsory labor	No forced or compulsory labor	
Security Practices	410-1	Percentage of security personnel trained in the organization's human rights policies or procedures that are relevant to operations	100% (Education on prevention of sexual harassment)	
Indigenous Rights	411-1	Total number of incidents of violations involving rights of indigenous people and actions taken	No related cases	
Human Rights Assessment	412-1	Total number and percentage of operations that have been subject to human rights reviews or impact assessments	-	
	412-2	Total number of employee training hours and percentage of trained employees on human rights policy and procedure related to the business	-	
	412-3	Percentage of significant investment contracts that contain the clauses on human rights or reviewed for human rights	-	
Local Communities	413-1	Percentage of operations with implemented local community engagement, impact assessments, and development programs	74, 75	
	413-2	Operations with significant actual and potential negative impacts on local communities	78~83	
Social Assessment of Supply Chain	414-2	Actual or potentially significant negative social impact and actions in the supply chain	84~96	
Public Policy	415-1	Total value of political contributions by country and recipient/ beneficiary	No related cases	
Customer Health and Safety	416-1	Percentage of significant product and service categories for which health and safety impacts are assessed for improvement Not applicable	Not applicable	
	416-2	Total number of incidents of non-compliance with regulations and voluntary codes concerning the health and safety impacts of products and services during their life cycle by type of outcomes No related cases	Not applicable	
Marketing	417-1	Type of product and service information required by the organization's procedures for product and service information and labeling, and percentage of significant product and service categories subject to such information requirements	Not applicable	
	417-2	Total number of incidents of non-compliance with regulations and voluntary codes concerning product and service information and labeling, by type of outcomes	Not applicable	
	417-3	Total number of incidents of non-compliance with regulations and voluntary codes concerning marketing communications, including advertising, promotion, and sponsorship, by type of outcomes	Not applicable	
Customer Privacy	418-1	Total number of substantiated complaints received concerning breaches of customer privacy and losses of customer data	No leakage of personal information	
Regulation	419-1	Monetary value of significant fines for non-compliance with laws and regulations concerning the provision and use of products and services	Not applicable	

Third Party Assurance Statement

THE CSR was requested by Korea Western Power Co., Ltd.(KOWEPO) to assure “2018 KOWEPO Sustainable Management Report” (hereinafter “Report”). THE CSR submits the results of its review of the publication process and contents of the Report to the management and stakeholders of KOWEPO.

Assurance Standards

We performed the assurance evaluation by reviewing whether the Report complies with AA1000AS (2008) assurance standard and reporting principle of GRI Standards which are internally used for assurance.

- Application of principles of stakeholder inclusivity, materiality, and responsiveness in AA1000AS (2008)
- Fulfillment of the principles for defining report content and report quality of the GRI Standards
- Fulfillment of Comprehensive Option of GRI Standards

Assurance Level

For the assurance, we performed the moderate assurance level by applying the principles of AA1000AS (2008) and conducted the limited level of data sampling and site interview. The assurance is Type 1. The assurance process includes the following major activities.

- Review of the feasibility of the materiality assessment process
- Review of reporting based on criteria for selected major topics
- Review of stakeholder participation
- Review of consistency with business report

Limitations

THE CSR has confirmed the reliability of the Report through the limited level of interviews and document reviews. However, it does not mean that the Report is 100% accurate.

Independence

THE CSR is an independent third-party institute and presents its opinions with the ethical and independent status secured.

Opinions

THE CSR submits the following opinions after a series of processes to verify compliance with assurance standard of the AA1000AS (2008) and the principles of the internationally recognized reporting guidelines.

Fulfillment of Comprehensive Option of GRI Standards

THE CSR reviewed whether the Report fulfilled the Comprehensive Option of GRI Standards which was the international guideline line for report publication and confirmed that the Report met the reporting criteria of general management disclosure and the reporting criteria of six major topics. The following table shows the assurance indices of major topics confirmed through the assurance procedure.

Economy	Not applicable			
Environment	• Emission_305-1-7	• Effluent and Waste_306-1-5		
Social	• Employment_401-1-3	• Customer Privacy_418-1	• Occupational Safety and Health_403-1-4	• Social Economic Compliance_419-1

Application of principles of AA1000AS (2008)

THE CSR confirmed that the Report applied three principles of AA1000 accountability standards.

Inclusivity

Does KOWEPO adhere to the principle of stakeholder engagement in order to ensure a responsible and strategic response in advancing sustainability management?

- THE CSR checked KOWEPO's stakeholder selection process and did not find any significant stakeholder groups that were intentionally omitted in the stakeholder participation process conducted by each department.

Materiality

Does KOWEPO report the issues important to stakeholders?

- THE CSR checked KOWEPO's procedure for identifying the issues to report and reviewed the materiality assessment procedure and did not find any problem.

Responsiveness

Does KOWEPO respond appropriately to stakeholders' requirements and expectations?

- THE CSR confirmed that KOWEPO had acknowledged the impact of its business decisions on stakeholders and that the Report appropriately described crucial issues of sustainability.

Recommendations

KOWEPO contributes greatly to improving people's lives and the national economic development through stable power supply efficient power generation. THE CSR recommends KOWEPO to strengthen the management of environmental impact of greenhouse gas and fine dust and expand the distribution of new & renewable energy such as solar, wind, and fuel cell more actively to be in step with the government's energy switch policy to improve sustainability. In particular, it is necessary to strengthen the management of the human rights and safety of local communities as KOWEPO expands the overseas business to be the future growth engine. THE CSR also recommends KOWEPO to solidify the comprehensive and effective foundation for sustainable growth by establishing and executing the sustainable management strategy together with its partners in the supply chain.

Eligibility of the Assurance Institute

THE CSR requested by KOWEPO to assure the Report is the specialized global sustainability assurance institute and has the AA1000AS (2008) assurance license officially certified by the UK-based AccountAbility which is the global sustainability management standard firm and is the Gold Community Member of the Global Reporting Initiative (GRI). Multinational CSR experts with CSR research achievements in many countries including Korea, the US, the UK, and Germany participate as members of the THE CSR Expert Committee.



August 2018
CEO of THE CSR **Jeong Se-woo**

A handwritten signature in black ink, likely belonging to Jeong Se-woo.

Awards

Year	Award Name	Awarding Agency
2015	Selected as the Best Institution at 2015 Safety Korea Disaster Response Exercise	Central Safety Management Committee
2015	Selected as the Outstanding Agency for Government 3.0 Evaluation of Public Institution	Ministry of Interior and Safety
2015	Ranked No. 1 in 2015 Sustainability Index of Korea Sustainability Contest	Ministry of Industry, Commerce, and Energy
2015	Grand Award in 2015 Management Quality of Korea Management Award	Korea Management Association
2015	Presidential Award in 2015 New Technology Commercialization Contest	KATS
2015	Grand Award in Public Institution for two years in a row of 2015 Korea Idea Management Award	Korea Suggestion System Association
2015	Presidential Award and Prime Ministerial Award in the 14th Korea Safety Award	Ministry of Public Safety and Security
2015	Grand Award in Public Institution (two years in a row) of 2015 Korea Idea Management Award	Korea Suggestion System Association
2015	Commercialization of New Technology (Presidential Award) - Institution	Ministry of Industry, Commerce, and Energy
2015	Outstanding Organization for Sharing of Outcomes	Ministry of Industry, Commerce, and Energy
2015	Received Ministerial Award for the purchase of products from the severely disabled	Ministry of Health and Welfare
2015	Presidential Award for job creation and overseas migration of young people	Ministry of Employment and Labor
2015	Outstanding workplace for a voluntary agreement for atmospheric pollutant management	Metropolitan Air Quality Management Office
2016	Received Grand Award at 2016 Management Innovation	KSA
2016	Grand Award in Public Institution (three years in a row) of 2016 Korea Idea Management Award	Korea Suggestion System Association
2016	Outstanding Public Institution for improving productivity	Ministry of Trade, Industry and Energy
2016	Achievement Award (Ministerial Award) for the promotion of AEO	Korea Customs Service
2016	Project of the Year Award	Korea Project Management Association
2017	Social Contribution Award Korea Chamber of Commerce and Forbes	Korea Chamber of Commerce and Forbes
2017	2017 Governor's Award for Sharing Governor of Chungcheongnam Province	Governor of Chungcheongnam Province
2017	Grand Award in Shared Growth Fund Idea Contest for Farming and Fishing Village	Large and Small Enterprise Cooperation Foundation for Farming and Fishery
2017	Job creation in the private sector at 2017 Public Institution Job Contest	Ministry of Strategy and Finance · Presidential Commission on Jobs
2017	Received Grand Award (two years in a row) at 2017 Management Innovation	KSA
2017	Grand Award in Public Institution (four years in a row) at 2017 Korea Idea Management Award	Korea Suggestion System Association
2017	Grand Award in Individual (Korean Suggestion Maestro) at 2017 Korea Idea Management Award	Korea Suggestion System Association
2017	Outstanding Institution for Cooperation of the Private and Public Sectors (Ministerial Award)	Ministry of SMEs and Startups
2017	Best Public Institution for Shared Growth (Presidential Award)	Ministry of Public Administration and Security
2017	Government Award (Korea Chamber of Commerce Chairman Award) at the 5th Korea's Respected Companies	Ministry of SMEs and Startups
2017	2017 Korea Green Climate Award	Ministry of Trade, Industry and Energy
2017	Presidential Award for proactive administration	Ministry of Personnel Management
2017	Deputy Commissioner's Award for job creation	Presidential Commission on Jobs
2017	Commendation for coping with climate change and reduction of greenhouse gas	Ministry of Trade, Industry and Energy
2017	Commendation for open innovation	Ministry of Trade, Industry and Energy
2017	Grand Award at the 14th Geumgang Environmental Award	Guem River Basin Environmental Office
2018	Social Contribution Award Korea Chamber of Commerce and Forbes	Korea Chamber of Commerce and Forbes
2018	Ministerial Award at "Haengbokdeoham Social Contribution Award"	Ministry of Education
2018	National Industrial Grand Award in Employment-Friendly Section	The Institute for Industrial Policy Studies
2018	2018 Outstanding Company for Job Creation	Ministry of Employment and Labor
2018	Received Grand Award (two years in a row) at 2018 Management Innovation	KSA
2018	12th National Sustainable Management Grand Award (Ministerial Award)	Ministry of Strategy and Finance

Participating Associations

Area	Association
Social Contribution	Korea Mecenat Association
Management Innovation	Korea Suggestion System Association
	KMA
Power Generation Technology	Korea Association of Machinery Industry
	Korea Electrical Manufacturers Association
Management Economy	Korea Association of Small Business Studies
	Seosan Chamber of Commerce
	Korea Electric Association
	Korea Project Management Association
	Korean Society of Civil Engineers
Construction	Korea Association of Construction Engineering & Management
	Jeonnam Wind Power Generation Association
	Korea Institute of Plant Engineering & Construction
	Korea Project Management Association
Project Development	Korea Plant Industries Association
Others	Power Forum
	Energy Future Forum
	Future Innovation Study Group
Quality Innovation	The Korea Master Association
	Korean Standards Association
	Korea Society of Quality Management
	Korean Nurses Association
Safety	Korea Industrial Safety Association
	Korea Education and Research Institute for Safety Economy
Disaster	Korea Safety Certification Agency
Climate and Environment	The National Assembly Forum on Climate Change

